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1973 Grad Ed Study Committee Report

Freeman, Mason

Naval Postgraduate School

NAVAL POSTGRADUATE SCHOOL

Monterey, California

REPORT

of the

GRADUATE EDUCATION STUDY COMMITTEE

20 July 1973

NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

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POSTGRADUATE SCHOOL NOTICE 1520

From: Superintendent

Subj: Establishment of a Navy Graduate Education Study Committee

Ref: (a) SECNAVINST 1520.4A

1. Purpose. To charter a study of Navy graduate education, in order to recommend specific long-term education objectives for the Naval Postgraduate School.

2. Background. The Secretary of the Navy promulgated a revised Navy policy on graduate education in reference (a) on 2 July 1971 and implemented the current Department of Defense policy for Military Officers. In his statement of policy, the Secretary of the Navy wrote, "Previous concepts of types and extent of academic knowledge required to establish the requisite educational base must be revised to any extent necessary to meet this modern challenge. ... Further, we must look carefully to the needs of the future so that we can meet, not only today's requirements, but the more complex ones of tomorrow." The need for the Naval Postgraduate School to study Navy graduate education follows from its responsibility to help provide leadership in carrying out this directive.

3. Action. Commander D. W. Mathews and Dean J. M. Wozencraft will act as Co-Chairmen of the Navy Graduate Education Study Committee. The other members of the Committee will be:

Professor J. E. Dawson
Professor R. S. Elster
Lieutenant P. E. Girard
Captain F. C. McQuigg USMC
Captain A. W. Rilling
Professor A. Sheingold

In addition, the entire staff, faculty, and student body are specifically invited to aid and support the committee in meeting its objectives, both by putting forward ideas of their own and by participating in the detailed study activities.

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4. Responsibility. The responsibilities of the committee will be to:

a. Determine the role of graduate education in preparing the professional Naval officer for the challenges of the future.

b. Study current and proposed career management policies and procedures to determine how best to integrate graduate education into Naval officer career patterns.

c. Recommend educational restructuring that will enhance the effectiveness of the Naval Postgraduate School in meeting future Navy graduate education objectives.

MASON FREEMAN

Distribution:
List 4 less F, F-1, F-3 through F-6
Plus Section leaders

ABSTRACT

Major changes in the advanced education of officers have always occurred following a wartime period. In the post-Vietnam period, change can again be anticipated and educational policy should be reviewed.

The overall objective of Navy postgraduate education is to provide an efficient springboard for the continued professional development of career officers. This objective is broken down in the FY 1974 DOD Military Manpower Training Report in terms of five specific military needs:

(1) The need to fill specified billets in which graduate education is essential for optimum performance of duty.

(2) The need for a well-educated pool of manpower from which to select leaders and policy makers of the future.

(3) The need to sustain morale and job satisfaction -- many officers seek personal fulfillment through higher education and its application in their work.

(4) The need for satisfactory career progression -- in the all-volunteer force environment of the future, the military must attract prospective officers who see industry and government organizations providing advanced educational opportunities for their employees.

(5) The need for military officers to keep abreast of developments in the civilian sector -- the military officer cannot function insulated and divorced from the civilian society.

The current postgraduate education system has been developed in keeping with JCS policy issued in 1964, and is addressed primarily to the first of these five needs. The subspecialty areas defined in OpNav Instruction 1211.6D of January 1973, the related nineteen career management communities under OTMS, and educational programs in the traditional academic disciplines have all been carefully refined and matched over the last decade by OpNav and BuPers to define requirements and gain efficient utilization of both URL subspecialist and restricted duty officers. The Navy's postgraduate education system has been a clear success, both in terms of numbers and of recognition by the promotion system. During the years 1964-1972, the fraction of URL officers in the grade of LCDR and above with postgraduate education has increased from 24% to 38%, and the fraction of Flag officers so educated has increased from 33% to 52%. If restricted

duty* officers are included in the count, these numbers become 29% to 44%, and 40% to 56% respectively.

Yet with all the effort given by the Navy, this system has not worked to reflect high utilization. In a recent study, 36% of all URL subspecialist officers had never served in a related billet, and only 48% of the validated subspecialist billets were manned by officers with a related subspecialty. The discrepancy between actually having a highly educated URL officer corps and the apparent utilization of their education when measured by specified disciplines in pre-determined billets speaks for itself despite a decade where the subspecialty system has been emphasized.

The real value of this education is measured in other ways. The compelling fact is that graduate-educated officers as a group significantly outperform their peers both in terms of fitness report index and promotion, independently of whether or not they have been utilized in the strict JCS sense. Moreover, this performance edge endures within the Navy; a reasonable measure of the overall URL officer loss per year is 4.58%, vice only 1.76% for those with graduate degrees.

Military personnel systems are closed systems. The principal characteristics of such systems include (1) almost exclusive entry of personnel at the bottom, followed by advancement or exit at various chronological stages; (2) a need for the continuous sequential rotation of personnel through assigned positions; and (3) the production of leadership from within the system. Thus closed systems are dominated by the requirement to manage persons (and the development of essential attributes, knowledge, and skills) whereas open systems must give emphasis to the management of positions, with qualified personnel drawn as needed from the society at large. Most of the difficulties in the current postgraduate education system stem from problems inherent in accommodating a static billet-based justification for education to the exigencies of a dynamic closed personnel system.

Graduate education aimed at supporting the subspecialty and restricted duty communities will continue to play a crucial role in the Navy postgraduate education system. This is true because academic discipline-based expertise is essential to meeting performance requirements in many billets in these communities. What is required in addition, however, is a

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*By "restricted duty" here is meant officers in the following communities:
1964: EDO, AEDO, COMM, INT, PHOTO, PUB INFO, HYDROG
1972: EDO, AEDO, CRYPT, INT, PHOTO, PUB AFF, GEO, OEO

modification that will permit recognition of appropriate professional postgraduate education as an equally essential element of a broader spectrum of billets. In particular, the need for advanced knowledge on the part of the operational officer has to be brought back into the education system.

In 1939 a large body of LTs had already attained postgraduate education; the fraction of LTs plus LCDRs with postgraduate education exceeded 46%. By contrast, only 16% of 1972 URL LTs plus LCDRs had received postgraduate education. The timing of officer education has not varied substantially during this quarter of a century, so that many of the 1939 LTs had time in service equivalent to the LCDRs of today. This fact notwithstanding, however, the availability of the educated officer for use in operating billets at sea is not now provided in the same strength as in that earlier day, despite huge increases in the complexity of the operating systems of the fleet.

Two measures would help reduce this disparity:

(1) the postgraduate education of officers in operational systems, and

(2) the gradual increase of the educated officer at sea.

In the latter connection, it is interesting to note that a quite opposite trend had recently come into existence. This is evidenced by a significant increase in the ratio of Restricted Line and Staff to URL officer strength in the grades LCDR - CAPT, from 0.253 in 1965 to 0.375 in 1973.

Postgraduate educated officers are highly desirable officers. As a group they have better fitness reports, higher retention, higher promotion rates, and lower fail select rates. In terms of career potential, the opportunity for postgraduate education has become the opportunity to compete fully for advancement to Captain and Flag rank. As postgraduate education is shared among the majority of these senior officers, it becomes an integral part of professionalism for Naval officers. Equity calls for virtually all career officers having an opportunity to compete on an equivalent educational footing with their contemporaries.

New policy for educational requirements and new educational processes are required to provide equitable opportunities for professionally valuable postgraduate education to officers who do not wish to become conventional subspecialists or work for degrees in the established academic disciplines, but choose instead to concentrate on a purely operational career. New curricula being developed in the ASW and EW areas are first steps towards providing postgraduate education in operational fields. Extension of these beginnings into a broader program (an operational systems curriculum) with flexibility to match student desires and abilities could provide the necessary stepping stones whereby a wide segment of the Navy's career officers can obtain the necessary development to remain competitive with their peers.

The successful manager ashore who is able to win political and budget battles gains the expertise and knowledge to do this from graduate educational development coupled with broad experience across many disciplines. The Navy must have top leadership to compete in this environment. But it is also a fundamental necessity that the Navy have leaders who are able to win battles in war. To maintain the essential blend of both types in the military requires educational opportunities aimed at the professional development of both.

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I. INTRODUCTION

The Graduate Education Study Committee was charged with the task of assessing the role of graduate education of naval officers in the future. Inherent in the element of futurity is some degree of uncertainty. To the extent they were available, however, factual data concerning past and present philosophies, policies, procedures, and activities related to Navy graduate education programs were examined. In addition, the experiences and perceptions of many persons outside of the Committee (including administration, faculty, and students of the Naval Postgraduate School; officials within career management agencies of the Navy, such as the Chief of Naval Operations (OpNav) and the Chief of Naval Personnel (BuPers); and members of the Postgraduate School Board of Advisors) provided inputs to the study. The report, however, is solely the responsibility of the Committee itself.

INITIAL TENETS

There are certain initial tenets which are essential to an understanding of the Committee's approach to its task and the content of this report.

First, the institutional activities of the Naval Postgraduate School (NPS) cannot be viewed in isolation. The School is but one element of a larger system: the officer personnel career management system of the Navy.

Second, military personnel systems are closed systems. The principal characteristics of such systems include (1) almost exclusive entry of personnel at the bottom, followed by advancement or exit at various chronological stages; (2) a need for the continuous sequential rotation of personnel through assigned positions; and (3) the production of leadership from within the system. Thus, closed systems are dominated by the requirement to manage persons (and their essential attributes, knowledge and skills), whereas open systems must give emphasis to the management of positions, with qualified personnel drawn as needed from the society at large.

Third, the advanced education of naval officers must take into account the closed nature of the personnel system in which they serve. Functions of the postgraduate education system include, at the very least, the elements of: (1) identification of educational needs; (2) the recruiting and selection of officer students; (3) the educational processes themselves; and (4) some measurable or demonstrable utilization of the educational experiences.

Fourth, the element of time is crucial in the operation of a closed personnel system. The basic characteristics of such systems demand that their management give recognition to the developmental flow of personnel

through sequential job assignments over time. Unfortunately, dynamic equilibrium is a rare (and often transitory) state. External and internal factors are equally likely to induce disequilibrium.

The foregoing considerations led the Committee to adopt a systemic view of the fundamental subject. This necessitated consideration of personnel policies beyond the immediate purview of the Naval Postgraduate School. Additionally, it called for attention to the dynamic nature of the overall process, particularly with regard to the effects of advanced educational activity over the full span of a naval officer's career. The concept of the naval postgraduate system (rather than the Postgraduate School) has been stressed throughout this report.

COST FACTORS

The Committee did not explicitly consider the direct dollar costs associated with postgraduate education. The notion of opportunity costs -- i.e., costs in terms of possible benefits foregone by doing one thing rather than another; for example, an individual officer undertaking advanced education rather than using the time to gain additional on-the-job experience -- is implicit in the examination of postgraduate education as a part of the overall system of officer career management, and is probably far more relevant.

Fully funded graduate education as a legitimate activity of the military services has recently been questioned in some circles, as it has periodically in the past. For the purposes of this study, it has been assumed that, properly conceived and implemented, fully funded advanced education for active duty military officers will continue to stand on its own merits.

ORGANIZATION OF REPORT

The Committee has developed its consensus on the basis of a firm belief in institutional evolution based on continuity. The postgraduate education system has served the Navy quite well in the past. Future growth, innovation, and adaptation to changing circumstances should be built upon the foundations of the best of past accomplishments.

Accordingly, a chronological approach has been taken in organizing the report. A review of significant factors in the historical development of the system is followed by analysis and critique of the current state of affairs. Next, assumptions concerning relevant future trends form the basis for discussion of the role of Navy postgraduate education in the future. The report concludes with consideration of the feasibility and adaptability of a spectrum of educational programs in the context of the evolving naval officer career management system.

DEFINITION OF TERMS

Except where otherwise indicated, the following terminology is used throughout this report to identify various categories of officer personnel:

Subspecialists: unrestricted line officers with graduate education and/or significant experience in certain designated fields.

Restricted duty officers: officers (excluding TAR and LDO designees) designated for Engineering Duty, Aeronautical Engineering Duty, Cryptology, Naval Intelligence, Public Affairs, Geophysics, Ordnance Engineering, Supply, and Civil Engineering.

II. HISTORICAL BACKGROUND OF THE NAVY POSTGRADUATE SYSTEM

The U. S. Navy has provided for postgraduate education for its commissioned officers, in a variety of modes, for more than a century. A detailed exposition of the historical developments would not be particularly useful. However, there are certain characteristics of the system's evolution which, in a precedential sense, are germane to future considerations.

EVOLUTIONARY CHARACTERISTICS

The system has been dynamic and adaptive to the changing needs of the Navy. It has changed markedly over time. It has changed with respect to the types of officers offered advanced education, the form and content of instruction, and the resources utilized for the educational process.

The balance among programs for generalist versus specialist officers has varied. From the 1870's until the 1920's the programs were exclusively oriented toward technical specialties. The opening of the General Line Course in 1929 introduced additional opportunities for unrestricted line officers to participate in advanced education. The post-World War II shift back to a technological emphasis in postgraduate programs has tended to obscure the fact that a general line program, albeit serving changing objectives, was an integral part of the postgraduate system for three decades.

Following exclusive use of outside institutions during the nineteenth century, the educational programs of the twentieth century have evolved from "on-the-job" training at military and civilian industrial activities, through the discretionary reading and guest lecture programs at the School of Marine Engineering, to the growth of formal academic curricula in the pre-World War I years. New fields of study have been introduced at appropriate times, e.g., the aeronautical engineering curriculum was started in 1919, reflecting the emergence of the airplane as a military weapon during the war. Programs during the war years of 1941 to 1945 emphasized short-term wartime requirements, yet a modicum of regular curricular offerings was maintained in anticipation of postwar needs. The authorization immediately after World War II for the School to grant academic degrees, and the subsequent accreditation of many of the curricula, have served to further formalize the educational processes. The emergence of degree-level management programs in the 1960's has tended to diminish again what had been an overwhelming technological predominance.

The mix of resources used for the postgraduate programs has also shifted over time. From initial reliance on foreign schools when the U. S. had no capability to provide the type of instruction desired, the system moved to a flexible mix among Navy "in house" and U. S. civilian

institutions. Post-World War II developments have tended towards an increased use of the "in house" capability. Characteristics of the resident faculty at NPS have likewise varied. Civilians with competent educational credentials have been the rule at the Postgraduate School; however, during the 1930's and early 1940's, a large number of military officers served on the faculty.

PRIOR STUDIES

The foregoing should not imply that there have not been problems associated with the evolution of the postgraduate system. The basic legitimacy of advanced formal education in a naval officer's career was a major controversy in the Navy until well into the twentieth century; schooling ashore was at odds with the strong tradition of learning through practical experience at sea. Indeed, the growth of the General Line course in the 1930's was essentially a pragmatic result of the fact that during the lean depression years there were not enough operating ships to train a sufficient number of naval officers; learning in school was accepted as a feasible substitute for the traditional "learning by doing" at sea. The General Line course was phased out as ships were added to the fleet during the years immediately preceding World War II.

As a result of the controversy, the postgraduate education system has been extensively studied over the years, both by internal Navy boards and external groups of civilian educators. Most significant among the early studies was the Knox-King-Pye Report of 1919. It expressed three major tenets, all of which marked some departure from prior attitudes and practices, and all of which were reiterated by the Taussig Board in 1929 and then again by the Pye Board in 1944. First, abrogation of the traditional exclusiveness of "learning by doing" at sea in favor of some role for advanced education in professional development was the basic thrust of the 1919 study. Second was the supporting notion of the need for a progression of educational experiences articulated with changing skill and expertise requirements over the span of a successful naval career. While not specifically identified as such, this was a clear recognition of the attributes of a closed personnel system and the dynamics of the flow of personnel through time, with emphasis on the fact that a single educational experience could not once and for all serve the needs of a total career even in the relatively unsophisticated Navy of the 1920's. Third, it expressed the idea of a combination of specialization with general professional competence: that "...every naval officer...while expert in certain fundamental elements of the profession, should be a specialist in at least one particular branch."

Incident to the Navy's efforts to secure legislation to modify the postgraduate system in the post-World War II years (e.g., authority to award degrees, acquisition of a new campus, etc.), the Bureau of Naval

Personnel contracted with the American Council on Education in 1947 for a study of the Postgraduate School. Within the report of the Heald Committee's detailed consideration of all facets of the postgraduate system is this significant statement:

> "We must emphasize again that the purpose of the School is to meet training requirements of the Navy. There is no need for the School to be concerned with civilian academic standards unless the maintenance of such standards will contribute to the training objectives of the institution."

This comment notwithstanding, the School has achieved and maintained comparability to civilian academic standards in almost all of its programs in the postwar era.

TIMELINESS OF REEVALUATION

Historical perspective shows that this nation's wars have marked turning points in institutional evolution. As a corollary, periods between wars have been characterized by new and identifiable trends in military as well as educational institutions. Detailed examination of the history of the Navy's postgraduate system shows that it has conformed to these hypotheses. Perhaps these are simply particular restatements of the obvious general fact that the upheavals of war will inevitably change the characteristics of the overall society. However, a new post-war period is at hand. There can be little doubt that the conflict in Southeast Asia has altered, in many respects, the fabric of U. S. society. Radical changes in military organizations and institutions are being induced by changes in the external environment, and change certainly appears to be more rapid. Current externalities would seem to dictate a comprehensive reevaluation of the postgraduate education system at this time.

In approaching this reevaluation, it is appropriate to repeat a basic premise: the maintenance of continuity is fully as important as the willingness to adapt by means of change and innovation. Therefore, before looking to the future, it is appropriate to examine critically the present state of affairs in the Navy's system for postgraduate education.

III. THE CURRENT POSTGRADUATE EDUCATION SYSTEM

Examination and critique of the postgraduate education system can best be approached in terms of the four essential elements identified in the introduction to this report: (1) identification of needs; (2) recruiting and selection of students; (3) the educational processes; and (4) utilization of advanced education.

IDENTIFICATION OF NEEDS

The determination of graduate education needs is based upon the identification and validation of billets which are adjudged to require specific academic preparation for optimum job performance. Coordinating agencies within the officer personnel management system process the expressed requirements of systems commands and other sponsoring agencies, and derive quotas for inputs to the available curricula. General educational requirements, i.e., educational quotas not linked to coding of the officer students for potential future matching to billets, are not included in the system beyond the baccalaureate level.

Not all Navy activities are engaged in the process of sponsoring advanced education requirements. In particular, the operating forces have no direct mechanism for generating educational quotas to serve their needs. Although a few (≈300) operational billets have been validated, the present postgraduate educational system is heavily weighted toward serving the shore establishment and agencies of the Navy Department. Benefits to the operating fleet are largely indirect. In the derivation of education quotas, however, the number of validated URL billets is multiplied by a factor of 2.4 in order to account for officer rotation, so that the availability of graduate-educated officers within the operating forces is significant.

RECRUITING AND SELECTION

Operation of the system requires the ability to attract an adequate number of officers capable and desirous of pursuing advanced studies in the areas for which quotas have been established. Two key elements in this process are recruiting and selection; assignment is a third, since it is not synonomous with selection.

Formal methods of recruiting consist of the publication and distribution of descriptive materials (career manuals, notices detailing the educational programs currently available, and the like) and the requirement that all eligible officers annually indicate preferences for curricula they would like to undertake. Their preferences are influenced, in a realistic sense, by the "service reputations" of the programs and informal counsel from their seniors. Whether or not it may be career enhancing to enter into postgraduate education, or which curricula are "best," are topics that are

informally, but very seriously, discussed by junior and middle grade officers throughout the Navy. With the possible exception of judgements rendered to individuals by their detail officers, personal contact with individuals directly concerned with the postgraduate system is not ordinarily a part of the formal recruiting process. Consequently, the officers' respective "votes" for their choice of curricula do not necessarily fit the distribution of curricular quotas or their academic aptitude.

The selection process is by annual formal board action. Consideration is given to military performance, academic potential, and stated individual preferences. Officers are selected on a primary/alternate basis for entry into specific curricula and are then available for a period of three years for assignment to postgraduate education. In addition, some officers are screened for graduate education, based on their educational potential, but are not identified with a specific curriculum.

Selection is not tantamount to assignment. Considerations of availability, competing career requirements, and Navy needs for detailing to other assignments often preclude the assignment of well qualified and selected officers to educational programs. The wide variation in numbers of graduate-educated URL officers as a function of Year-Group attests to a significant element of chance in achieving entry into postgraduate programs.

THE EDUCATION PROCESS

It has been mentioned before that the mix of "in house" education programs and those conducted at civilian universities has varied over the years. During the past decade, the use of in-house programs has predominated.

The actual educational process is the point at which the Naval Postgraduate School now becomes primarily involved in the postgraduate education system. Within the conduct of the educational programs, the School must be responsive in considerable detail to the perceptions and desires of sponsoring agencies with regard to specific curricular content. It must also conduct the programs within the constraints imposed by the overall personnel management system, e.g., the types and qualifications of officer students assigned, and the time allowed for their education.

At present, education requirements and resultant programs are largely identified in terms of commonly recognized academic disciplines. The Postgraduate School academic departments are correspondingly organized and their degrees are typically granted with the traditional designations. The standard curricula are designed not only to meet departmental degree requirements, but also to include additional courses deemed by the curricular sponsors to have special relevance to Navy needs. The result is more rigidity and fewer electives than is characteristic of civilian graduate

programs or recommended by advisory and accreditation groups. In recent years there has been some movement in the direction of interdisciplinary programs to attack the basic problem of melding traditional disciplinary studies with potential utilization in specific naval applications. The current development of operational systems technology curricula, such as ASW, is a further attempt to align postgraduate education more closely with naval applications.

THE UTILIZATION PROCESS

In examining the utilization process it is necessary to make distinctions among the types of officers receiving advanced education. In the case of restricted duty officers and officers of the various staff corps, to the degree that the curricula they have undertaken relate to their particular specialties, utilization appears high. Such officers largely serve in identified billets within their specialty areas. Since the postgraduate education and performance requirements are reasonably well correlated, the opportunity costs of education, amortized over time, become nominal in relation to the benefits achieved.

The situation in the case of subspecialist unrestricted line officers is quite different. In contrast to the Army, which educates officers at advanced levels only for direct subsequent assignment to validated billets, the Navy usually interposes an operational tour in the officer's warfare specialty immediately after his school assignment. And in contrast to the Air Force, which modifies the officer's primary identification code upon his completion of advanced education, the Navy assigns a secondary (hence the word "subspecialist") code. The rationale is that the Navy career management agencies will match the officer's subspecialty-coded educational experience with billets calling for that particular brand of advanced education when the officer returns to shore duty.

To meet the objective of better URL career management, the Operational Technical Managerial System (OTMS) has been established. Making use of the subspecialty coding system, it is intended to provide the same longitudinal career management to the technical and managerial facets of an officer's career as was applied to his operational career pattern in the past.

To this end, nineteen subspecialty communities have been delineated. Each community has a subspecialty review board which meets to select "Proven Subspecialists," this selection being analogous to command screen. It is these officers who will man the "command equivalent" billets, such as Project Manager. Although not precluding command at sea, OTMS provides career patterns to Flag selection not requiring command at sea.

To conduct this management the Officer Professional Development Division (Pers B4) has been established. Its responsibilities are to monitor the subspecialty communities, ensure utilization of subspecialists in subspecialty billets, and maintain subspecialty data.

OTMS is consistent with the Navy's intent that subspecialist unrestricted line officers maintain a warfare-based career pattern at sea, while periodically applying their education-derived knowledge and skills in designated subspecialty assignments ashore. Thus direct and specific utilization of these officers' education is necessarily intermittent, although most subspecialists believe that it finds broad effective application even in their non-subspecialist assignments.* Officers seeking more continuous direct utilization provide the backbone of the restricted duty communities.

CRITIQUE

Successes of the System. With regard to the successes of the system, it is most significant that it has proven to be well suited to the educational needs of the restricted duty officer communities. In an era of burgeoning technological developments this has been vital to an organization as capital intensive as the Navy. Further, primary reliance on the traditional academic disciplinary base for almost a quarter of a century has allowed for development of a maturity in the educational programs. The attraction and retention at NPS of a highly competent and educationally vigorous civilian faculty with long involvement in the problems of the Navy is not the least of the benefits which have accrued. Finally, the discipline-centered programs have an inherent capability for durability and flexibility in their application to the needs of the Navy.

The timing of existing educational programs relative to officer career patterns also seems appropriate: most students in technical programs generally begin postgraduate studies after five years of operational experience in the fleet, and students in management start after approximately nine years. From a conventional educational point of view, this is somewhat late; but it has three advantages in the case of naval officers. It allows for prior experience and maturity in student point of view; for educational refurbishment as they approach their second ten-year career epoch, which will differ

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*In a recent OSD survey[1] of graduate-educated officers across all ranks, 66.3% of the Naval officer respondents felt that their advanced degree significantly enhanced their performance more than half the time in those assignments which were not designated "graduate degree essential" jobs. A second survey restricted to Navy officers with fully-funded graduate education shows that this perception increases rapidly with rank.[2]

markedly from the first in terms of level and kind of responsibilities; and for selecting students from a group of proven performers strongly motivated to make the Navy their career. Indeed, a reasonable measure[3] of the subspecialists with graduate degrees lost per year is 1.76%, vice a URL average of 4.58%. The phasing of technical education early enough to allow utilization in the first ten-year career epoch is particularly important. The change between epochs brings a shift in responsibilities from direct technical/operational duties to indirect management duties (even when technical); it is appropriate for officers to concentrate their middle-grade graduate study in the management field. Once again, this is a result of the closed personnel system flow requirement.

Shortcomings of the System. The current justification of fully-funded graduate education, established by the Joint Chiefs of Staff in 1964, is based on specific billets validated as requiring that education for optimum performance of duty. Most of the difficulties in the current postgraduate education system stem from problems inherent in accommodating this static billet-based rationale to the exigencies of a dynamic closed personnel system.

One effect on the identification of educational needs is the introduction of a time lag between changing needs and their recognition and documentation. Another effect, compounded by inevitable looseness in the relationship between education and job performance in any endeavor except the licensed professions (law and medicine, for example), is a tendency to over-compensate by unwarranted precision in the establishment of quotas and the definition of curricular content.

Finally, because the billet quotas have been largely identified with the shore establishment, the overall educational support of fleet operations has tended to be indirect and apparently inadequate.

This inadequacy is evidenced by a number of indicators: difficulties with the 1200 lb. steam systems which required the assignment of Engineering Duty officers to what had been URL billets; the 1972 CIACT committee finding that fleet communication difficulties stem in large measure from too few officers expert in communication system operation[4]; the judgement of an Admiral that the sonar systems in his command were operated at no more than 20% of their design effectiveness; the large number of graduate-educated officers who have been pre-empted from utilization as subspecialists to meet other Navy needs. The requirement for additional expertise in the operation of fleet systems seems clear now, and may be expected to become increasingly urgent in the future.

With regard to recruiting, selection, and assignment, the specific-billet orientation of the educational programs leads to an apparent lack of conviction among many junior officers of the unrestricted line that the types of education offered are personally desirable or career-enhancing.

Within the educational processes themselves, the charge of curricular rigidity has already been identified and deserves serious consideration. In the Navy's postgraduate education system, the Naval Postgraduate School has the opportunity to be far more flexible than other educational institutions: to experiment and innovate, and thereby better serve unique Navy requirements for officer development.

In the utilization of educationally derived attributes and skills, distinction must be made between the two major types of officers involved. The system utilizes the restricted duty officers quite effectively. With regard to the subspecialist group of unrestricted line officers, however, utilization consistent with the present rationale of graduate education does not consistently or generally occur. This problem appears to be systemic. One set of agencies is concerned with requirements determination and quota generation; another deals with recruiting, selection, and assignment; the School conducts many of the programs; and a different combine controls the utilization process. While many graduate-educated URL officers do follow the subspecialist pattern, including utilization in specific coded billets, a substantial number do not.* It is important to note that these latter subspecialists, albeit "unutilized" in the JCS sense, also rate among the best performers in the Navy. It is evident that a subspecialty system based solely on specific billets is not an entirely satisfactory approach to the management of graduate-educated unrestricted line officers.

The preceding shortcomings all deal with the way the postgraduate education system affects those officers who are in that system. There remains a large group of URL officers who are essentially uninvolved in the current postgraduate education system. While apparently outside the postgraduate education system, they are affected by it in the competition for assignments and promotions throughout their careers.

Subsequent chapters (especially V and VI) will indicate current actions by the Navy and proposals of this committee to attack these shortcomings of the system.

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*A recent study shows that 36% of all subspecialist officers have never served in a related subspecialist billet.[5] Since the data included 7594 P-coded and 4437 S-coded officers, and the latter presumably earned their subspecialty through billet occupancy, the implication is that the fraction of graduate-educated subspecialists who have never served in such a billet approximates 57%.

In a second study[2] restricted to subspecialists whose graduate education was fully funded, the fraction who have never served in such a billet was somewhat smaller (46%); the fraction who do not desire assignment to such a billet was only 13%.

IV. ASSUMPTIONS FOR THE FUTURE

Without becoming unduly speculative, there are predictable trends relevant to the future of Navy postgraduate education which can be identified. These can best be examined in terms of technological trends, cultural trends, resource management trends, and implications for Navy career management systems. Following a general discussion of these trends, specific implications for Navy advanced education will be considered.

TECHNOLOGICAL TRENDS

There can be little doubt that technological developments applicable to naval operations will continue at a rapid, if not explosive, pace. They will probably occur over a broad spectrum of fields, some as yet unidentified. It is axiomatic that the capabilities of the officer corps must keep pace with these developments.

In an era of shrinking personnel strength levels, smaller fleet forces, and more stringent resource constraints, the capital intensive nature of the U. S. Navy is bound to become even more significant. Technical and managerial competence will be demanded of officers of the Navy to an even greater degree than in the past or at present.

CULTURAL TRENDS

Prediction of rapid technological advances is perhaps all too obvious; future changes in cultural and human factors may be less apparent, but are no less significant.

The Navy's postgraduate system has tended to reflect external trends in higher education in the society at large. Higher education in the U. S. today is in a state of flux, searching for viable new directions. The validity of academic degrees as an accurate measure of educational accomplishment is being questioned; the naked pursuit of degrees for their own sake may become far less prevalent; and new educational alternatives are emerging in a variety of forms. Enrollments in the traditional four-year colleges are plateauing, but the number of students in community colleges is rising rapidly. As a result, higher education appears to be moving in the direction of becoming more vocational, more practical, and more utilitarian. Continuing education programs are much more significant than only a few years ago, both on an individual and organizational basis. Navy educational programs at all levels will have to adjust to these trends.

Of greatest import is the matter of the motivation of individuals in the society of the future. Numerous past studies have suggested that people

(including naval officers) like to develop knowledge and skills and then use them -- to become good at something. A more frequent finding in recent studies is that young persons embarking on a career are demanding more than simply a "good fit" from an occupation; they also want employment that provides an opportunity to use their special and unique abilities, and the chance to be original and creative.

It is submitted that the naval officer of the future will be less passive in accepting the dictates of his seniors. He will expect a greater role in determining his future, and his perceptions of personal and career needs will have to be more overtly satisfied. In the process of advanced naval education the perpetration of extensive mismatches between individual aspirations and the organizational needs will be far less tolerable. In particular, officer students will vigorously seek curricula that are relevant both to their personal interests and to their envisioned careers, a characteristic fully consonant with the Navy's rationale for postgraduate education.

RESOURCE TRENDS

The development of the all-volunteer force requires mention. The volunteer officers who entered the military in the face of selective service are not the same as the volunteers who will choose military careers in the absence of the draft. The factors discussed above will certainly pertain. The incentives for a military career (including the opportunity for advanced education) will be more important; the possible disincentives (such as "involuntary servitude" in the educational arena) will have to be minimized.

Prospective modifications in military grade-level and retirement systems will also have future impacts. Their ultimate effects are as yet indeterminate in detail, but it may be anticipated that they will call for a better tuning of the relationships among education, utilization assignments, and career patterns.

Greater cost-consciousness in defense activities (with personnel costs not the least significant) will certainly be a prime consideration for the future, at least in the near term. It may be anticipated that resource allocations for advanced military education programs will be more critically examined.

Reductions in the number of operating fleet units, already a reality, will also have impact. Consequent reduction in opportunities for officers to demonstrate their capabilities and potential in operational assignments at sea will call for alternative modes of professional development and progression. In the sense of educational activity, this represents a distinct area of opportunity as well as of responsibility.

CAREER MANAGEMENT TRENDS

The imperatives for Navy career management of the future follow logically from these projections. The requirements for broad competence in many fields and for intellectual agility of the officer corps of the Navy will not diminish but will instead become more critical. There will be an absolute need to be more responsive to individual perceptions, needs, and desires. With regard to advanced education for naval officers, an efficient integrated system governing the chain of need determination - recruiting and selection - education - utilization will be the only way to cope with more stringent resource constraints.

It should be noted that innovative steps have already been taken to try to streamline the machinery of career management for the unrestricted line officers in the form of the Operational Technical Managerial System. OTMS is a flexible medium for future career management which has the capability of accommodating adjustments over time to meet changing requirements, including those of postgraduate education. Accordingly, the phraseology of this report has been chosen to manifest consistency with OTMS concepts. It should be noted, however, that the content of the report is independent of OTMS details.

EDUCATIONAL IMPLICATIONS

Technological trends dictate that the Navy sustain specialized education for restricted duty and subspecialist officers. In addition, technical comprehension will increasingly be expected of large numbers of non-subspecialist URL officers. Further, the speed of modern technological development leads to a rapid decay of expertise if it is not maintained and up-dated. The current mode of postgraduate education provides only for the acquisition of initial competence. A strong case can be made for the need for continuing education programs for officers whose technical background becomes outdated and/or too limited in breadth as their responsibilities increase.

Technical expertise is not the sole requirement. In the coming era of increasingly severe resource constraints, management competence will be equally important. The basis for management expertise can be provided through formal education, subject to the same considerations set forth in the preceding paragraph.

Rigid curricula organized along conventional academic disciplinary lines will not suffice for meeting future Navy needs, if indeed they do for the present. Combinations among technical and scientific fields of study, and between technological and management disciplines, will be required. Individualized programs of study may be the only effective way to meet future needs.

It will be mandatory that the educational programs of the future be more responsive to the perceptions and needs of the individual officer students. A dual test of the appropriateness and viability of the post-graduate education system will be its general acceptance by the Navy and the enrolled students.

The need for a confluence of the elemental operations of the system in the process of utilization of educational experiences has already been detailed. This would seem to dictate a redefinition of the role of advanced education within the careers of unrestricted line officers. Longitudinal management of careers, including articulation with and among the various educational components, will be an essential requirement for the system of the future.

V. FUTURE ROLES FOR POSTGRADUATE EDUCATION

The discussion thus far provides a basis for looking to the future -- a foundation on which to build some comprehension of and accommodation to the identifiable trends and uncertainties of coming years.

Three essentials derive from analysis to this point: (1) the requirement for increased flexibility and sensitivity to environmental dynamics and internal Navy trends on the part of the Navy's advanced officer education system; (2) the need for improved coordination between the postgraduate education process and longitudinal career management, particularly for officers of the unrestricted line; and (3) the need for greater accommodation to varying personal aspirations and motivations of officers. The first factor is, for the most part, amenable to actions within the educational system itself; the second and third involve all facets of officer career management.

This section will consider possible response modes within the education system itself. The next major section of the report will explore the applicability and adaptability of the modes detailed in this section to the overall career management system.

It should be stressed at the outset that the propositions advanced here are neither exhaustive nor necessarily all designed for immediate implementation. They are, rather, intended to catalyze further thought and discussion, both within the naval education system and among other naval activities involved in officer personnel management at large. Some may be feasible in the short term, others would require long range development. All should be subject to the test of acceptability by the diverse agencies concerned with the systemic elements of postgraduate education.

GENERAL CONSIDERATIONS

As in preceding sections, it is appropriate to examine the education system in terms of component parts, again with the caution that they are interrelated and interdependent. Major elements to be discussed below are: (1) the types of officers to be given postgraduate education, i.e., the "clientele;" (2) the kinds of educational programs to be conducted -- their form and content; and (3) the resources to be utilized in carrying out the programs.

Clientele. A few basic options are open. The system can continue to emphasize specialty education for restricted duty officers and the subspecialty skills for URL officers. In view of the difficulties encountered in the apparent utilization of educationally based skills for some segment of the

URL officer population, the system could narrow its focus to serve exclusively the restricted duty corps. Or it could expand its clientele, become more comprehensive in scope, and attempt to better serve diverse needs for different varieties and combinations of skills required in the naval profession. Differing magnitudes of movement in either direction from the status quo are possible, and any shift would lead logically to concern for the next element -- proper types of educational programs to serve the changes.

With respect to the Naval Postgraduate School itself it should be noted before proceeding that there are additional clientele the School might serve well. Greater enrollments of officers of other military services might be encouraged; and civilian personnel of the military and other government departments should be able to benefit from some of the programs.

Educational Programs. Program alternatives must be initially dependent upon decisions as to the types of officers to be educated. Curricula with the traditional academic disciplinary base will continue to serve effectively the educational needs of many restricted duty and subspecialist officers. If the election is made to broaden the range of officers who can benefit from postgraduate education, then available choices become more numerous.

Still within the traditional academic mold, inter-disciplinary programs may be further developed among technological fields and between them and management studies. The new Operational Systems Technology program in ASW is an example of a sequence of studies which adds an "operations" flavor to a multi-disciplinary program. More general (non-degree or degree without specification) programs could also be developed to meet unique Navy requirements. The prime measure of success here should be utility within the Navy, rather than the conventional test of academic accreditation.

The present predominance of the academic degree objective in postgraduate education should be seriously questioned. It is reasonably certain that the opportunity to obtain a degree is a very strong motivational factor; it provides recognition to the officer student in a currency which has value both within the Navy and in his dealings with the civilian sector. This factor cannot be disregarded in the existing system. However, non-degree programs could have a significant role in future postgraduate education, particularly for non-subspecialist URL officers. Some of the prognoses for the future concerning educational trends in general and the future characteristics of young naval officers in particular support this judgement. So also does a recent OSD survey[4] in which 32.6% of the graduate-educated Navy officers responded that they would have been willing to obtain appropriate non-degree graduate education.

Resources. The most obvious resource consideration is whether or not fully funded graduate education can be supported in the future. The question

as stated is beyond the purview of this report, in which it is assumed that graduate education will be supported to the extent that it proves cost-effective. The latter condition, that of the cost-effectiveness of education -- is addressed at the end of this sub-section.

A further question concerns the choice of institutional resources. At one extreme an obvious question arises: if the educational programs are restricted to the traditional academic disciplines, might not they be conducted wholly at civilian institutions of higher education with equal effectiveness and/or greater economy? At the other extreme, if all Navy educational programs must be specially tailored to meet unique Service needs, the Naval Postgraduate School might be the only suitable resource.

Neither extreme seems tenable: conventional academic disciplines alone do not suffice, nor are all Navy educational needs unique. NPS cannot efficiently provide the breadth of coverage afforded by the totality of universities, nor can any particular university efficiently provide special relevance to Navy problems (even in the traditional disciplines) without assuming the image of an NPS. In particular, the ability to foresee impending Navy educational needs, and to respond rapidly with innovative multi-disciplinary curricula, is attainable only through a combination of long Navy association and basic academic strength.

The possible development of insularity and parochialism within the military has also been alluded to as a prospective hazard of All-Volunteer Forces.[6] Should the specter arise, changes far more pervasive than in the postgraduate education system alone will be required. The relevance to this study is to engender the stipulation that "in house" educational programs are justified only to the extent that they have significant benefits and/or elements of uniqueness not readily obtainable from the larger society.

The opportunity costs of postgraduate education must be considered in terms of the type of job experience most of the students are foregoing. Most Navy graduate students in technological fields are URL officers who now matriculate in their fifth year of service. These officers are normally completing a sea tour upon assignment to school. Shore billets for junior officers without graduate education are generally neither so demanding nor responsible as the sea billets which they hold. Neither are they so valuable in terms of officer professional development as most sea billets. In terms of experience foregone in a shore billet lost, the opportunity costs of graduate education are minimal. On the other hand, the benefits are far from minimal in terms of subsequent job performance, qualification to occupy more substantive billets, and cognitive skills and self-confidence gained. The challenge is to provide evolving graduate education and career management systems that together maximize the payoff in terms of the utilization of education in meeting Navy needs. Specifically, a

principal responsibility of the services in peacetime is to devote adequate resources to the development of the leadership necessary to meet future military contingencies.

A final point concerning resources: it was stated earlier in this report that opportunity costs were more germane to the cost-effectiveness of postgraduate education than were direct dollar costs. In absolute terms, the dollar cost of officer development through advanced education programs is by no means trivial; but amortized over an officer's career through proper utilization of the achieved expertise, the investment should be returned many-fold.

UNDERLYING FACTORS

During the years 1964-1972 the fraction of URL officers in the grade of LCDR and above with postgraduate education has increased from 24% to 38%, and the fraction of Flag officers so educated has increased from 33% to 52%. If restricted duty* officers are included in the count, these numbers become 29% to 44%, and 40% to 56%, respectively. The Navy's postgraduate education system has been a clear success, both in terms of numbers and of recognition by the promotion system.

This success, of course, has not been unaccompanied by growing pains. The 1964 JCS guidelines justifying fully funded postgraduate education on the basis of specific billets requiring such education for optimum performance of duty, were predicated on a defense establishment with vital, but minority, needs for officers with special expertise. As the need for graduate-educated officers has shifted from minority towards majority status, increasing strain has been placed on the compatibility of the JCS guidelines and the imperatives of overall officer career management. The strain is evidenced by a significant increase in the ratio of restricted duty to URL officer strength in the grades LCDR-CAPT, from 0.253 in 1965 to 0.375 in 1973. An inference is that the Navy needs, and that a significant group of graduate-educated officers are inclined towards, greater career concentration in their academic field than the subspecialty system afforded: these are the officers who transferred out of the URL. The strain is further evidenced by the high fraction of subspecialist officers who have never served in a related subspecialty billet, and by the fact that in a recent study only 48% of the validated subspecialist billets were manned by officers with a related subspecialty.[7] The fact that the group of subspecialists without "utilization" in the narrow JCS sense were among the top performers in the Navy in terms of fitness reports (see

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*By "restricted duty" here is meant officers in the following communities:
1964: EDO, AEDO, COMM, INT, PHOTO, PUB INFO, HYDROG
1972: EDO, AEDO, CRYPT, INT, PHOTO, PUB AFF, GEO, OEO

Section VI) attests a broader need for graduate-educated officers than the JCS guidelines envisioned and belies a casual charge of bungling in their assignments.

The Operational Technical Managerial System provides the framework of an officer personnel management system designed to accommodate both the diversity of officer inclinations and the diversified and changing needs of naval service.

A major conclusion of the study committee, however, is that although the Navy postgraduate education system is well adapted to meeting a continuing need for restricted duty and subspecialist officers, it is too rigid to meet a growing need for the postgraduate education of non-subspecialist URL officers.

It might be argued that the existing education system, based on the academic disciplines, is not in fact too rigid. The outstanding performance of the "unutilized" subspecialist partially supports this view, as does the fact (previously noted) that 66.3% of Navy respondents to the recent OSD survey felt that their graduate education had significantly enhanced their performance in over half of their "non-degree essential" assignments. By contrast, however, 94.4% of these respondents considered their education to have been useful in their last subspecialty assignment.[1] Another contra-indicator is the instantaneous enthusiasm from all quarters for institution of the Operational Systems Technology (ASW) curriculum.

The fundamental objective of graduate education is to provide an efficient springboard for continued professional development. The degree of efficiency depends upon the relation of the education to the experience that follows. The argument is not that the graduate education presently available is bad for the "unutilized" subspecialist, but that appropriate educational opportunities unconstrained by degree requirements in the established academic disciplines should be even better for many officers. Most important of all, a wider variety of educational opportunities would make the springboard of postgraduate education available to a much broader segment of the URL, for many of whom existing programs are unsuited in terms both of the officers' motivations and the uses for which the Navy needs them.

A second major conclusion of the study committee follows directly: that the traditional disciplinary studies provided by the postgraduate education system should be supplemented by a variegated mix of flexible programs aimed at better understanding (from a multi-disciplinary point of view) of the principal operational systems on which the Navy depends. Depending on their duration, these new programs would warrant the award either of a certificate or of a Master's degree without specification. All programs will have to meet the test of Navy need and officer subscription.

The requirement for these more flexible opportunities is dictated not only by the needs of the Navy for increased professional expertise, but by equity in the personnel management system. As the fraction of URL plus restricted duty officers in the grade of LCDR and higher with postgraduate education approaches 50% -- and all trends point to this -- a system predicated exclusively on the education of a minority of subspecialist/restricted duty officers becomes unstable. The segment of the line officer community whose dominant concern is operations at sea will seek and deserve equal opportunity to gain the competitive edge that appropriate education provides.

The next three subsections consider major program alternatives consonant with the committee's conclusions. Discussion of timing, residence requirements, funding of education, and related questions -- all of which are applicable to the full range of program proposals -- will complete this section on future roles for postgraduate education.

RESTRICTED DUTY/SUBSPECIALIST EDUCATION

General Comments. There is a continuing need for educational programs in support of restricted duty officers whose education-derived expertise is based on technological and managerial fields, and who will be principally employed in either technical or management activities or (more realistically) in some combination of both. For these officers education based on traditional academic disciplines, but with strong orientation towards Navy applications, should be continued. Indeed, these traditional education programs will continue to be the intellectual font of the activities of the postgraduate education system. These programs are equally desirable for unrestricted line officers whose personal ambitions and potential Navy occupation will be largely within appropriate subspecialties or who might later shift to restricted duty status.

Non-Traditional Programs. In response to changing societal needs and goals, many educational institutions now offer advanced academic degrees with such non-traditional designations as Systems Science, Transportation Engineering, Urban Development, Resource Management, and others. The assumptions for the future discussed earlier indicate that the Navy is faced with changes of equal, or greater, magnitude. It follows that the postgraduate education system should also develop non-traditional curricula, not in simple conformance with trends in higher education at large but in fulfillment of its responsibilities for academic leadership in meeting future unique Navy needs.

In general, education requirements should be comprehensively examined for the identification of current (and impending) needs which may best be met by means of new curricular arrangements. With the continual growth in

the complexity of Navy systems, one example of a non-traditional program well suited to changing needs might be "systems integration." A broadly based education here would include a strong foundation in both engineering and systems analysis, and develop student capabilities in relating realistic technological solutions to large scale naval problems. Specific utilization billets for officers with such attributes should be identifiable, and coherent interdisciplinary programs leading to a degree in Systems Integration could readily be organized within the educational system. Similar efforts in other areas should lead to other cogent designations (e.g., Environmental Analysis, Aero-Electrical Engineering, Research Management, etc.), and to the development of supporting coherent interdepartmental degree programs.

Adjunct Professional Studies. The problem of correlation of education and utilization in cases where the officers' education is of value in only one or a few subsequent duty assignments has already been identified. A further step in non-traditional programs might be the organization of studies aimed at providing broader career preparation, i.e., not solely tied to specific billets or billet sequences. Fuller career preparation could include studies in more academic areas than are generally encompassed in a single degree program. For example, typical patterns of officer assignment within the second career epoch involve a progressive increase in management and executive leadership responsibilities. A study program appropriate for the award of a master's degree in a technological field will not, in meeting that objective alone, include significant studies in the management area. Similarly, a program leading to an advanced degree in management will not, of itself, provide the technical insight necessary for effective managerial performance in many parts of the Navy. It would, therefore, be highly useful to augment present (and some of the proposed non-traditional) programs with what might be termed "adjunct professional studies." A coherent, career-oriented management sequence could be offered in conjunction with the technical degree programs, and corresponding technological sequences associated with the management degree programs. In fact, something on the order of "adjunct professional study" programs could be a first, and immediately available, step in the direction of ultimate development of carefully designed interdepartmental and continuing education programs.

Intra-Curricular Flexibility. The actual development of non-traditional degree programs should consciously attempt to allow for student officer preferences and individual perceptions of their career needs. Subject to the constraints imposed by generally accepted degree requirements, overly precise dictates by the administration, faculty, or sponsor as to what combinations of courses must be included in such a curriculum should be avoided. The flexibility inherent in a variety of syntheses of traditional studies, innovative combinations, and recognition of individual student interests and objectives, could serve as a vital hedge against uncertainty as to what specific types of expertise will be required of naval officers of the future.

These same caveats apply with equal force to many of the established curricula within the postgraduate education system. In its 1955 review of the Naval Postgraduate School, the accreditation committee of the Western Association of Schools and Colleges commented that "a strictly regimented graduate school is something of a contradiction." Similar observations recur consistently in the annual reports of the Advisory Board to the Superintendent. Coupled with the extraordinarily high number of contact hours required in the standard curricula, this relative lack of elective freedom militates not only against wider inquiry by students, but also against their probing more deeply into a subject than the course outline prescribes. The operative fact is that it is not possible to prejudge the long-term marginal return, either to the officer or to the Navy, of one subject vice another taken in addition to generally accepted degree requirements. This is particularly true in the case of URL officers.

Given adequate curricular flexibility, many students should be able to incorporate the adjunct professional studies into their programs without either extending their educational tour or failing to meet reasonable requirements for a master's degree in their field of specialization. Others could use the flexibility to gain greater exposure in their field, and then either terminate on schedule or extend their tour to encompass the adjunct studies. In the latter case, the additional accomplishment could be recognized by a certificate and where appropriate in the officer's fitness report.

OPERATIONAL SYSTEMS EDUCATION

Non-traditional education in the form of interdisciplinary designated-degree programs would still be primarily designed to meet subspecialist requirements in the case of unrestricted line officers. If the postgraduate system is to expand its capabilities, it must also serve a larger segment of the line officer community, whose principal concern is operations at sea. The extensive Navy system of functional training activities serves the development of specific operational expertise, and Naval War College and/or Armed Forces Staff College courses provide generally for professional study of tactics, strategy, and the conduct of war. The academic study of operational systems, however, is a role that fits best within the framework of the postgraduate education system. The Operational Systems Technology (ASW) curriculum recently initiated is a first step towards integrating traditional academic studies into a coherent sequence intended to serve operational needs, i.e., for better utilization of educational experiences by officers of the line.

Validation of programs of this type will depend upon: (1) realization of broader utilization of the resultant expertise in the operational environment; and (2) recognition of the value of such education by the career management agencies -- proof by action (e.g., assignment to duties of importance, selection for promotion, etc.) that completion of programs of

this sort are, in fact, career enhancing. With regard to the first factor, if utilization of the officers enrolled in the present program is essentially limited to technological ASW billets ashore, then what has been achieved is merely the creation of one more non-traditional subspecialty, not an operationally useful course of study. The second factor obviously depends on actions within the overall personnel management system: it will take several years to achieve proof of acceptance.

The effort, time, and resources required to develop innovative educational programs give rise to a serious question: will they still seem optimum five or ten years hence? Too detailed a focus, or too narrow a scope, may work against such programs in a future of rapidly changing operational requirements and uncertain technological applicability. Particularly in the case of non-subspecialist URL officers, a spectrum of educational offerings flexible enough to accommodate wide variations both in officer inclinations and in their prospective careers seems necessary. The natural focus of such offerings is the set of major operational systems on which naval warfare depends -- not just ASW or EW (on which work has already begun) but also weapon systems, command information systems, logistic systems, and the like. In the structuring of these educational programs, especial care should be taken to facilitate rapid and efficient evolution in response to evolving utilization patterns within the OTM career management system.

Appendix A is an outline of one specific proposal for innovative programs which could achieve this. It is presented in significant detail not to suggest that it is the only structure that will work, but rather to present a picture complete enough to suggest the inter-relationships of the various elements and objectives.

This is not a proposal for replacement of the current programs (or of the additional types of restricted duty/subspecialist education discussed above), but could be initiated in conjunction with them. As indicated in the appendix, officers who have indicated a clear preference for a specific curriculum and have been duly selected for the program of their choice (as would be expected particularly in the case of Restricted Line and Staff Corps officers), would be directly enrolled in that curriculum either at the Naval Postgraduate School or at an appropriate civilian university, as is presently the case. Many officers, however, cannot be assigned to their preferred curriculum, or would like more advice or information or knowledge of their academic abilities and motivational interests before committing themselves to a preference. The Operational Systems (OS) curriculum outlined in Appendix A would be designed to meet these officers' needs through the use of:

(1) Studies in a number of disciplines, coupled with academic and career counseling, during the initial phase.

(2) Several options which provide an evolvable spectrum of programs consonant with the spectrum of career paths available under OTMS, during the terminal phase.

After a general core program of approximately six months, the student in the OS curriculum would, with advice and counsel from various sectors of the postgraduate system, devise a continuing program which coincides with his career objectives and educational motivations. Three options would be available: to transfer into an existing specified-degree program, to pursue a short course leading to a certificate of completion, or to pursue a long course leading to a master's degree without specification.

To pursue the second or third options, the student would first select one of the Navy's major operational systems (for example, weapons, electronic warfare surveillance, ships, logistics, etc.) on which to focus, and then select as his curriculum a set of coherent course sequences (called "tracks"), each of which relates to that major system. A comprehensive list of tracks and which of these relate to which system or systems would be provided for student guidance.

A carefully conceived and judiciously executed Operational Systems program would serve to complement the existing educational and career management system. Its inherent flexibility permits easy adjustment to evolving Navy needs, and matches the spectrum of interest, available time, and operations-at-sea focus which characterize the careers of many naval officers.

CONTINUING EDUCATION

With the exception of the charge of rigidity, the most serious criticism of the Navy's advanced education system is that it makes no provision for maintenance and expansion of the individual expertise it advocates, fosters, and develops.

Timing. The time frame within which the existing programs are conducted is essentially proper, and the innovations suggested in previous sections of this report would fit in the same pattern. However, the opportunity to improve service to the professional development of naval officers over a greater time span (and thereby better serve Navy needs) by an extensive and vigorous set of continuing education programs should not be lost by default. In some instances, Navy objectives would seem best served through the development of special programs, of varying duration, at NPS. They need not call for the extensive additional allocation of resources, and they could be modified and/or discarded as their usefulness changes. It is perhaps obvious that the development of such programs would only be following the trends within higher education at large, and in other Services.

Educational Objectives. There are two distinct objectives of continuing education for naval officers, and programs aimed at supporting these objectives should differ substantially according to which goal they address.

The first objective is refurbishment and updating in a field in which significant competence has already been achieved. The need for updating stems from the combined effects of the ongoing march of knowledge and the inevitable decay of specialized expertise which accompanies the broadening of officer experience through diversified assignment. Programs addressing this objective should be unstructured: the availability of a few review courses to resharpen analytical tools, plus the opportunity to take state-of-the-art courses in appropriate subjects, will suffice. Many studies of this sort can be (and are) undertaken by officers on their own time. In some cases it may be cost-effective, however, to supplement off-duty opportunities by full-time assignment as a student for a semester. In either event, the principal requirement is for insightful educational counseling.

The second distinct objective of continuing education is extension of an officer's knowledge into a new dimension. Typical patterns of officer assignment within the second career epoch involve progressive broadening of responsibilities. It is neither possible nor desirable to anticipate and provide each officer all of the academic knowledge he will most need later. Voids are bound to arise, and a variety of intensive tightly structured programs aimed at filling them should be available. Flexibility within single programs is not required -- the educational objective is specific and self-standing -- except in the time and place of offering. Ideally these programs should be presented near large centers of officer concentration, but isolated from the turmoil of the students' normal duty. Currently appropriate program foci would include such topics as behavioral science, resource management, applications of micro-computers, signal identification and classification, high energy lasers, and the design and evaluation of system performance tests. Much of the subject matter required for the adjunct professional studies and Operational Systems curriculum is likely to be appropriate also in this continuing education context; although the objective here would be current job enhancement rather than fuller career preparation, the desirable intellectual content should be largely the same. The principal distinction stems from the increased maturity of the students, which would imply the need for a different level of presentation.

ANCILLARY CONSIDERATIONS

Discussion to this point has dealt mainly with program considerations. Matters of resources available and possible steps related to initial program implementation are equally important, but are viewed as being supporting elements to program alternatives.

Resources. Fully funded graduate level education for officers of the military services has been assumed to be viable and essential, in the future as in the past. But exploitation of additional flexibility in the Navy's educational system should permit economies in the average cost per officer. Combinations of off-duty studies (essentially at the expense of individual officers) could be established as prerequisites for lesser government funded education, or postgraduate education could be tailored (and shortened) to provide only a proper foundation upon which individual officers could build toward the earning of academic degrees by means of their own resources. The Navy's Campus for Achievement aims in this direction on a broad front, but the coordination of postgraduate education for officers is sufficiently important and distinctive to warrant special attention.

Further in this vein, innovative combinations of existing educational programs have already been mentioned. Greater articulation with other military educational institutions and activities (e.g., the War College, official off-duty programs, etc.) might be profitably explored. For example, suitable Naval War College courses might be offered at NPS, or conversely. An almost infinite variety of other mixes of resources for education could be considered -- correspondence courses, extension programs at military facilities (including ships), and formal cooperative programs with civilian institutions and industrial activities, for example.

The question of residence requirements for degree programs is related and pertinent. Must a course of studies leading to an advanced degree be wholly completed within the awarding institution? An affirmative response may not be a realistic view for the future. With particular regard to post-graduate education, greater efforts within the system to coordinate and recognize outside work of sufficient rigor may do much to improve the productivity, potential value, and economy of the Navy's postgraduate education system. For example, there might well be areas wherein basic preparation at the Postgraduate School could best be culminated at a civilian university particularly competent in a given area; conversely, basic studies at some civilian institutions might be concluded with some particularly unique offering of the Postgraduate School. Both of these modes have existed in the past.

Initial Implementation. A fairly comprehensive set of proposals has been advanced for achieving greater flexibility in postgraduate education. To summarize to this point they were, essentially in reverse order: the establishment of a variety of continuing education programs, the establishment of operational system programs, and enhanced restricted duty/subspecialist programs (both in standard disciplines and innovative non-traditional curricular fields) to the extent that utilization through application to officer career needs can be supported. The more general of these proposals are long range in nature. But there are programmatic actions readily

available in the short run which could improve the existing, and further enhance the proposed, programs.

There are a number of internal actions, largely in the collective hands of the NPS departmental chairmen and administration, which could enhance existing program flexibility and ultimate usefulness. Differences in the early course content and sequencing in related curricular areas can be minimized so that controlled shifting between curricula can be effected without undue time penalties to the students. Delaying final selection of concentration areas within curricula until relatively late in the program would allow for adjustments and could better be made in consonance with established career preferences. A less rigid approach to course requirements within individual curricula -- specifically, a conscious effort to identify areas wherein greater choice of electives can be allowed -- would certainly better serve the individual nature of officer career requirements. Finally, the encouragement of major efforts by the School to conduct a professional program of career and academic counseling to each individual student could have significant benefits in helping meet Navy career management objectives.

Other possible actions would involve the participation of outside agencies. For example, enrichment of the existing programs could be achieved by tying the educational experience to closely allied experience tours at naval or industrial laboratories or other appropriate types of activities. A particularly attractive option in the case of restricted duty officers would be combining a tour at NPS with a tour at a Navy Laboratory. A cooperative Engineers (or Doctor of Engineering) degree program, with thesis and some additional course work being done at the Laboratory, could be carried out with a saving of almost a year in total time.

For all postgraduate programs, the effectiveness could be enhanced by a general increase in the flexibility of the time allowance for the educational tour. Students now enter school with a wide variety of academic backgrounds and require varying times to prepare for specific graduate studies. This time requirement might be reduced by the more extensive use of preliminary correspondence or extension courses. During the tour, rewarding enrichment of the program might be obtained, as has been previously indicated, via adjunct professional studies, free-elective courses, an experience tour at a naval or industrial laboratory, and dual-degree programs. The adoption of a flexible time frame, which ordinarily would range from 1 1/2 to 3 years, can result in the tailoring of individual programs of particular worth.

VI. ARTICULATION WITH CAREER MANAGEMENT SYSTEM

The preceding section enumerated some new directions that formal programs of postgraduate education for naval officers might take. The proposals were essentially restricted to the educational process itself, rather than addressing the postgraduate education system as a whole. Therefore, this section will treat briefly the articulation of the educational proposals with the overall officer career management system. The principal objective is to explore means of achieving closer, more mutually supportive ties among the many agencies concerned with managing the elements of the officer personnel system related to advanced education.

Steps recently taken by the Bureau of Naval Personnel should impact favorably on each of the four basic functions of the officer personnel management system related to advanced education: identification of needs, recruiting and selection of officer students, the education process, and utilization of educational experience. Among these steps are the reorganization and consolidation of P-codes, the authorization for Headquarters to establish P-coded billets where necessary to meet overall Navy needs, a broadening of the sponsorship of subspecialty communities, the designation of "proven subspecialists", provision for promotion paths branching off from the command-at-sea tradition after successful command in the grade of CDR, and subspecialty community representation in the detailing process. The thrust is towards a higher degree of longitudinal career management, aimed at achieving the Knox-King-Pye board ideal (quoted earlier) that "...every naval officer...while expert in certain fundamental elements of the profession, should be a specialist in at least one particular branch."

The discussion that follows is not intended to be exhaustive. Rather, it is an examination of only the most significant points of interaction between postgraduate education and the overall management of naval officers' careers.

GENERAL CONSIDERATIONS

Officer Recruitment. One major point that affects, but is not a part of, the postgraduate education system is the dependence of the entire officer personnel system on the characteristics and qualities of the Ensigns recruited into the Navy each year. Prior to World War II, the pyramidal grade structure of the officer corps was far narrower at its base than in recent years, during which roughly only one Ensign in six survived to the rank of LCDR. It seems inevitable under the impact of All Volunteer Forces and changing grade level authorizations that the Navy will revert towards the earlier mold. As this occurs, it will become progressively more important to attract into the officer corps a much higher percentage of young men well suited ab initio to the long-term needs of the Navy.

The interactions of officer recruitment and the postgraduate education system will be twofold: the recruiting image of the Navy will be affected by the degree to which educational opportunities are recognized by prospective officers as an integral part of officer professional development; and conversely, the character of the educational programs must accommodate the mix of aspirations and intellectual aptitudes (e.g., management/political science/technology) inherent in the group of officers which the recruiting system attracts.

Timing of Education. Although the current timing of education has already been characterized in this report as generally appropriate, the narrowing of the base of the officer pyramid should provide a better opportunity to identify earlier in their service young officers who have a high probability of retention as career officers. The impact on the education system would be to enable adjustment, from 5 years back towards 3 years of service, in the normal matriculation zone for technological (and the proposed Operational Systems) curricula. The pragmatic limitation on such an adjustment will depend on the ability to free junior officers from other assignments, and acceptable risk in the identification of career officers.*

From an educational point of view, the advantage of earlier matriculation would be the increased ease with which technological material could be absorbed. Vastly more important, however, would be the impact of increased opportunity for utilization of the officers in operational billets at the Department Head level. The potential advantage is underlined by the contrast in the educational level of the current officer corps in the grades of LT and LCDR with that before World War II. In 1939, 44% of the LCDRs and 48% of the LTs had already attained postgraduate education, whereas in 1972 these fractions were 30% and 8%, respectively. The timing of officer education has not varied substantially during the intervening years, so that many of the 1939 LTs had time in service equivalent to the LCDRs of today. This fact notwithstanding, however, the availability of the educated officer for use in operating billets at sea is not now provided in the same strength as in that earlier day, despite huge increases in the complexity of the operating systems of the fleet.

Given earlier matriculation, more flexibility would be possible in adaptation of the education system to the changing demands of the Navy as officers progress through their career. With regard to the Operational Systems curriculum in particular, it would be possible to provide early in an officer's career a first postgraduate year mainly devoted to technology, followed by a second year after approximately nine years of service in which the focus would be management plus technological updating. A certificate would be earned by the end of the first year, and a master's degree at the end of the second.

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*The desirability of earlier matriculation will diminish if normal promotion to LCDR is delayed until 10-11 years of service, as now proposed by DOD.

IDENTIFICATION OF EDUCATIONAL NEEDS

Restricted Duty/Subspecialist Education Programs. Identification of educational needs by means of quotas derived from specifically identified and validated billets has proven well suited to the Navy requirements for advanced education of restricted duty officers. Recent modifications in sponsorship arrangements aimed at increasing the flexibility and responsiveness of inputs to the educational programs should serve to improve on past practices and -- perhaps of more significance -- may provide a better basis for development of more non-traditional and inter-disciplinary programs. Continuing efforts to improve the flexibility of sponsorship of postgraduate programs, and a greater dialogue between sponsoring activities and those conducting the education, should be consciously fostered in order to provide a more rapidly responsive hedge against the uncertainties of future educational requirements. These comments regarding advanced education for restricted duty officers also pertain, in large measure, to subspecialty education for officers of the unrestricted line.

Non-subspecialist Education Programs. Education directed at the non-subspecialist segment of the URL is not amenable to precise quantitative identification of requirements on a billet-by-billet basis. Indeed, for education such as the Operational Systems curriculum discussed earlier, assignment policies far less restrictive than to billets "validated" in the JCS sense would be desirable. An initial guide to the desirable apportionment of officers among different areas of study focus could be derived from counting billets in the operating forces to which these areas are most relevant. Insofar as the desirable absolute numbers of officer graduates in these areas is concerned, however, there is no criterion available beyond the philosophical imperative that this nation deserves from each career officer the greatest expertise of which he is capable. Given educational offerings of proven professional worth, each career officer should have the opportunity to find his own level.

The caveat of "proven professional worth" is, of course, non-trivial. The proposed OS programs have no precedents, and no proof of worth exists. Certainly the programs should start with enrollments as small as academic efficiency (class size, etc.) permits. The fastest -- and perhaps the surest -- feedback mechanism for determining professional worth will be the numbers of officers seeking matriculation after a few years of program operation. If in addition there is no imposition of fractional quotas among the different areas of study, this same mechanism of officer "votes" should provide a strong measurement of the professional value of the various study options. To preserve this feedback, quotas should not be used unless the maintenance of balance among the major operational systems proves a problem, an eventuality that careful career counseling during the educational process itself might well preclude.

Continuing Education Programs. Few Navy precedents are at hand in the matter of requirements determination for the types of continuing education programs suggested, although it is noteworthy that many more Air Force officers are engaged in continuing education than in degree programs. The inter-relation between continuing education, the proposed OS programs, and adjunct professional studies has already been noted. Given appropriate policy decisions and an inventory of courses, the latter could be offered by direct negotiation between the using agencies and the Postgraduate School, at the initiative of either party, and eventually (to a considerable extent) on the basis of user compensation for resources involved. They could be residential at the School or at locations specified by the user(s), and of almost any appropriate duration. Moreover, existing courses proffered by civilian schools could be exploited, or special courses developed at NPS taught by civilian schools under contract. A principal requirement would be the establishment of an administrative and coordinating agency. In addition to satisfying user demands, this agency should also arrange to meet valid continuing education requirements initiated by individual officers.

RECRUITING AND SELECTION

Although coalesced as a single major component of the postgraduate education system, the relevant considerations pertaining to recruiting and selection are sufficiently different to dictate that they be examined separately.

Recruiting. It was noted in Section V that the proportion of graduate educated officers among those who are successful in their military careers (as measured by timely promotion) has been increasing steadily since World War II. More significantly, the fact that line subspecialists -- including those who have engaged in utilization tours -- have on the whole been more successful in gaining promotion than the total population of their peers belies the myth that subspecialization is dangerous for the unrestricted line officer and that postgraduate education is therefore a shoal to be avoided.

The rationale supporting postgraduate education is to maximize the contribution to the Navy by each officer recipient. An available measure of individual contribution is the Fitness Report Index (FRI), and it is important to note the high degree of correlation between FRI and graduate education. For example, a recent analysis of 6004 subspecialist URL officers (all of whom were "due course" with respect to promotion) in terms of FRI quartiles yielded the data in the following table:[8]

TABLE: DISTRIBUTION OF SUBSPECIALISTS BY FRI

FRI Quartile	URL Norm	P-Coded	No Utiliz.	Proven Subsp.
I	25%	28.1%	29.0%	40.6%
II	25%	25.7%	25.6%	27.4%
III	25%	24.0%	24.0%	19.6%
IV	25%	22.2%	21.4%	12.4%
(Sample Size)		(6004)	(3261)	(1600)

It is clear that P-coded officers as a class outperform the norm, independently of utilization, and that the subclass selected as proven subspecialists is truly outstanding. It must be recognized that the selection of officers for fully-funded graduate education is based in part on prior outstanding performance of duty, and that not all proven subspecialists are necessarily graduate educated. Nonetheless, the obvious conclusion is that high prior performance plus graduate education produces a high yield of exceptionally effective officers.

These promotion and performance facts should be made known, and there exists a mechanism for publicizing them. The OTM System has been the subject of much published information as well as briefings to groups of officers affected in recent months. Information concerning the historical viability of postgraduate education, and the prospects for greater potential value in the future, could be included. In fact, beyond the question of recruiting, OTMS and postgraduate education in some of the new modes being suggested could be mutually supportive; innovative education can serve OTMS, and OTMS policies can facilitate progress in educational programs. However, regardless of the medium, the fact of the demonstrable value of advanced education both to the Navy and to the individual officer should be better publicized.

Selection. There has been little change in the basic selection process in recent years, but there are bound to be great changes in the relevant externalities in the immediate future. Manpower policy imperatives such as the All Volunteer Force, the shrinking size of the officer corps, and prospective changes in the grade-level and retirement systems, will call for re-examination of the incentives and disincentives inherent in the process of selection for postgraduate education.

The lack of equity in a selection/assignment system based on opportunities for restricted duty/subspecialist education alone is likely to become progressively less tolerable in the future. Mismatches between individual

perceptions of educational needs and actual curricular assignments will have to be minimized, if not eliminated. Far better articulation among prior educational experiences, operational experiences, postgraduate education, and subsequent duty assignments will have to be achieved. The selection and assignment to postgraduate education should be a major area of concern if future programs are to be successful.

If priorities for postgraduate education must be imposed, they should be based primarily on the performance and promotion potential of prospective students rather than on their undergraduate records, which have proven to be uncertain indicators of education potential 5-9 years later. If the proposed OS programs prove successful, it may be hoped that nearly all career officers can gainfully participate to some extent. In any event, the problem of guiding individual officers into suitable educational programs will take on a different complexion when the generation of a minority of restricted duty/subspecialist officers is no longer the sole objective. Moreover, a significant number of the graduate students currently enrolled at NPS state they had planned to switch curricula on arrival, which indicates that improvement in the curriculum assignment process should be possible even within the existing programs.

Certain general actions to improve the curricular assignment process can be considered. First, a better match between undergraduate curricula and advanced programs to which officers are ordered should be attempted. This might be facilitated by a larger role for the School in the process, e.g., by its serving as a central repository for the analysis of academic records. Second, there should be a similar attempt to correlate prior operational experience with postgraduate education. This lies solely in the hands of the central career management agencies. Third, since prior education and/or experience may by themselves be an inadequate guide to the needs or desires of the officer entering advanced education (particularly in view of the greater maturity of individuals after several years of Naval service and a "late blooming" motivation towards education) the availability of a program of testing and evaluation might be extremely useful as a means of providing guidance to individual officers. This could be in the hands of career management agencies, the Postgraduate School, or -- preferably -- both. Finally, guidance and counseling during the educational process can serve to assure the best possible program assignments. The School can, and should, have a major role in this regard.

With regard to specific programs, direct inputs to restricted duty/subspecialist education can best be handled as at present. Given the operation of a program such as the OS curriculum, a lesser proportion of direct enrollments might ultimately become feasible; transfer from the OS core could compensate for the difference. Flexibility in assignment to specific programs in consonance with current Navy needs as well as better correlation between individual and Navy perceptions of future requirements

could well result. Similarly, non-traditional combinations of disciplinary programs may permit far less rigid curricular assignment policies.

For the success of the OS program, non-specific curricular assignment is mandatory. There should be a high degree of certainty of assignment to student status once an officer is selected for the program. Educational and career counseling at the Postgraduate School, with extensive participation by career management agencies, should play a major role in student guidance, but a high level of choice for the officer student should be assured.

For continuing education programs, selection and assignment should be in part the responsibility of the major claimants who generate needs and provide resource compensation, and in part initiated by individual officers who would apply for participation as appropriate.

THE EDUCATIONAL PROCESS

To reiterate, a major contribution that can be made to the efficacy of the overall system during the educational process itself would be greatly expanded educational and career counseling at the Postgraduate School. The need for counseling is attested to by the fact that of the U. S. graduate students currently enrolled at NPS, 73% felt that academic counseling was nugatory, and another 12% felt that the counseling they had received was counter-productive. Similarly, career counseling was felt to be nugatory by 77% of the students, and another 14% felt they had received bad career advice.[9]

A second contribution may be equally important. Reliable data concerning the role and influence of advanced education in the careers of naval officers is sparse, sometimes contradictory, and often difficult to obtain. In conjunction with the career management agencies and other personnel research activities, the resources of the Postgraduate School could be used to generate better data for use in the design of future programs. Matters such as the characteristics which predict success in the educational programs (and subsequent careers), student attitudes and perceptions (with respect to the School and the Navy), and longitudinal studies of subsequent career patterns (and success) of officer students could be undertaken. The results could be produced within existing capabilities, and would have a high probability of future usefulness.

Given the institution of non-traditional study programs, an Operational Systems program, and other departures from traditional disciplinary studies, the Postgraduate School would have to participate to a greater extent in the reporting of educational attainments and the subsequent coding of officer expertise and potential capabilities.

UTILIZATION OF EDUCATIONAL EXPERIENCE

Utilization is obviously the focus of the entire postgraduate education system. Related considerations have been discussed in previous sections and need not all be reiterated here. It is worth re-emphasizing, however, that the judicious implementation of proposals for non-traditional programs of study plus allowance for more flexibility in all programs, could be a major step in facilitating better utilization of educationally derived expertise and skill. For example, 64% of the officer graduate students presently at NPS feel that more electives would help them personally and professionally in their education. Actions presently underway within subspecialist assignment activities, particularly increased longitudinal career management practices, should also help alleviate future utilization problems.

With regard to the foregoing proposals for non-subspecialist URL programs of education, i.e., the Operational Systems curriculum, the intent is to provide solid support for the basic concepts underlying the OTM System. However, such support can be useful only if there is extensive collaboration among all of the agencies concerned throughout all four principal phases of the system governing advanced naval officer education.

There are two principal barriers to more direct contribution of postgraduate education to the effectiveness of naval operations. The first is the constrictiveness of the 1964 JCS guidelines, which were devised to facilitate the generation of a minority group of necessary restricted duty/subspecialist officers but which today leave the Navy vulnerable to criticism of the large numbers of graduate-educated officers never assigned validated billets, no matter how crucial their actual assignments may be. The second barrier is inherent in the flexibility required by operational commanders in their use of officers, which generates strong resistance to the validation of P-coded billets within the forces. The dilemma posed by the incompatibility of these two requirements is the root of the utilization problem.

It seems possible to by-pass the dilemma to some extent by the introduction of professionally meaningful non-degree postgraduate education aimed specifically at the needs of the operating forces. Other improvements can be found in the designation of operational billets that would preferentially but not mandatorially be filled by subspecialists, and in the assignment of validated subspecialist positions to operating units as a whole, rather than to specific billets within them.

These strategems, and others like them, require interpretation of the JCS guidelines somewhat broader than the written word. Whether it would be better to skirt the issue, or to face it squarely through renegotiation of the guidelines, is not a question within the competence of the Graduate Education Study Committee.

VII. RECOMMENDATIONS

Throughout its deliberations, the Graduate Education Study Committee has been struck by the historic fact of significant changes in Naval postgraduate education during post-war periods. Consequently, the shape of major future developments has occupied the committee's attention much more than have specific, current and internal questions. The committee's recommendations point the direction of changes which in its judgement would be beneficial to officers, the postgraduate education system and the Navy. These recommendations touch on many existing activities and relationships; however, in the opinion of the committee, efforts of far greater continuity and intensity will be necessary for effective integration of the postgraduate education system during the coming period of major change. It is hoped that these recommendations can be a catalyst for worthwhile discussion among those with interest in and responsibilities for the design and conduct of Naval postgraduate education. It is through these discussions that more refined proposals and appropriate plans of implementation will be forged. The recommendations follow:

1. That NPS should work more directly with the officer career management agencies in integrating the role of postgraduate education throughout the various stages of officers' careers. Specific areas that could beneficially be addressed on a continuing and formal basis include at least: selection of students, choice of curriculum, alignment of educational codes with career communities, and the timing and duration of educational programs.

2. That NPS should also work more directly on a continuing and formal basis with user organizations, particularly operational commands and subspecialty advisors, to sustain alignment of postgraduate educational programs with evolving Navy needs.

3. That in considering innovations and changes to meet future Navy educational requirements, it should be stressed that traditional discipline-based programs have served and will continue to serve vital requirements. These types of programs should be continued, but modified to provide greater flexibility in accommodating changing needs and diversity among students. New interdisciplinary programs, leading to advanced academic degrees and P-codes, should be introduced where appropriate.

4. That in order to provide a full spectrum of educational opportunities, NPS should seek authority to undertake the phased development of a variety of programs within the proposed Operational Systems (OS) curriculum. As an initial step, the Electronics Warfare program could be developed within the OS framework.

5. That NPS should work directly with appropriate Naval commands in establishing, coordinating, and administering a program of continuing education. Particular requirements will exist in academic record-keeping, and the offering of courses in a variety of locales and under a variety of auspices.

6. That competent academic and career counseling should be made readily available to all officers on a continuing basis, and especially while in residence at NPS.

7. That NPS should undertake continuing formal studies aimed at assessing the effectiveness of the postgraduate education system in meeting evolving Navy educational needs. These internal studies should be coordinated with external reviews having related objectives.

REFERENCES

1. "Survey of Military Graduate Education," RCS:DD-M(OT)731, Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs), January 1973. (For an extract of preliminary data analysis, see Appendix C, Section 1.)

2. Hurst, LCDR C. R. Jr. and Shaddix, LT D. S., "Opinion Survey of Naval Officers Who Have Received A Navy Sponsored Graduate Degree," M.S. Thesis, Naval Postgraduate School, June 1973. (For an extract of the data analysis, see Appendix C, Section 2.)

3. Hunter, LCDR R. W., "Developing the New Decision-Makers, a Qualitative Analysis of the Navy Subspecialty System," Ph.D. Thesis, The American University, April 1973. (The loss figures were derived from Table 8-S on p. 167, by averaging the data for Year Groups 52-63.)

4. CNO Industry Advisory Committee on Telecommunications, Final Report, 25 July 1972.

5. Hunter, op. cit., p. 160.

6. Military Manpower Training Report for FY 1974, Office of the Secretary of Defense (Manpower and Reserve Affairs), March 1973 (p. 40).

7. Hunter, op. cit., p. 160.

8. Hunter, op. cit., pp. 132 & 214.

9. Appendix C, Section 4.

Appendix A

PROPOSAL FOR OPERATIONAL SYSTEMS CURRICULUM

THE URL SPECTRUM

The thrust of graduate education in the Navy today provides education in the academic disciplines for all officers who attend. Many unrestricted line (URL) officers are not inclined in this direction and do not envision career involvement with the subspecialty system. In addition, significant numbers of subspecialists never serve in a related subspecialty billet, which leaves the postgraduate education system vulnerable, on the surface at least, to a charge that a great deal of education is being wasted. Granted, there are important general benefits derived from the educational process which will increase the effectiveness of most officers. But what about the specific benefits of the course material?

The Navy's officer career management system (OTMS) recognizes various operational, technical and managerial skills that are enhanced by graduate education. Every officer will encounter a need for acuity in some subset of these skills during his career. Through the identification of the "proven subspecialist", OTMS recognizes those officers who have demonstrated expertise in one or more areas (listed in Table 1) of special Navy needs. URL officers who want to concentrate their efforts in one of these areas are well served by the subspecialist educational programs presently offered. They start with a motivation in that area and will seek out experience in it.

On the other hand, the URL includes a spectrum of officers with diverse talents and motivations, and OTMS provides a corresponding spectrum of career paths. In part, but with a serious omission, the postgraduate education system provides a spectrum of matching educational offerings.

All URL officers aim ultimately at the bringing together of major functional systems -- ships, planes, weapons, surveillance, logistics, etc. -- in the prosecution of naval warfare. But some officers will concentrate on questions of strategy and tactics; for these officers the Naval War College curricula provide postgraduate education to help develop the necessary knowledge and insight. Others will concentrate on system design and procurement, and the subspecialist curricula serve their needs. And still others will focus on the more effective operation of these major systems; it is here that the gap exists in the spectrum of postgraduate education.

The seriousness of this gap is evidenced by a number of indicators: difficulties with the 1200 lb. steam systems which required the assignment

of engineering duty officers to what had been URL billets; the 1972 CIACT committee finding that fleet communication difficulties stem in large measure from too few officers expert in communication system operation*; the judgement of an Admiral that the sonar systems in his command were operated at no more than 20% of their design effectiveness; the large number of graduate-educated officers who have been diverted from utilization as subspecialists to meet other Navy needs. The requirement for additional expertise in the operation of fleet systems seems clear now, and may be expected to become increasingly urgent in the future.

PROPOSED OPERATIONAL SYSTEMS (OS) CURRICULUM

In order to fill the gap in the spectrum of educational offerings, it is proposed that, in addition to the curricula presently offered, an Operational Systems (OS) curriculum be established.

Officers who have indicated a clear preference for a specific degree curriculum, and have been duly selected for the program of their choice, would be enrolled directly in that curriculum either at the Naval Postgraduate School or at an appropriate civilian university, as is presently the case. Officers who prefer the OS program, or who cannot be assigned to their preferred curriculum, or who want to defer a decision until more information and academic experience is available to them, would be assigned to the OS curriculum.

The OS curriculum would consist of the following:

1. A refresher course of six weeks.
2. A six-month general education core of broad dimensions.
3. Academic and career counseling during the general education core.
4. A decision point at which to choose a course of study and have it approved.
5. Courses of study would fall into three categories:
    a. The OS short course leading to a certificate of completion.
    b. The OS long course leading to a master's degree without specification.
    c. An established subspecialist curriculum leading to a master's degree with specification.

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*Final Report of the CNO Industry Advisory Committee on Telecommunications, dated 25 July 1972.

The refresher course would serve the same purpose it does now: to reestablish a pattern of good study habits and reintroduce certain basic academic skills. In order to emphasize the former, it should include one orientation course in which the student is introduced to:

1. the objectives of the educational process and the career management system and how to meet them;
2. the processes of learning.

This course might be in the nature of a seminar and group discussion.

The general education core would provide a broad exposure to many fields of study. This would allow the student to determine for himself his strong areas both academically and motivationally, and would assist him and his counselors, both at NPS and BUPERS, in making an intelligent choice at the decision point. (A suggested core program is shown in Table II.)

During the general education core program intensive academic and career counseling should be available to the student. To meet this objective it is suggested that students entering this program be assigned to Operational Systems curricular officers during their general education core and refresher, with the ratio of students to curricular officer not exceeding 50:1. Each curricular officer would be assisted by an academic associate. Both should be well trained in counseling in general and career counseling in particular. They would work closely with BUPERS in helping the officer student choose his program. After the general education core the student would be assigned to the curricular office appropriate to his course of study.

The decision point in an officer's program would come at about the middle of the second quarter. He then must decide which of the three options (subspecialty, long course or short course) he wishes to pursue. If he opts for either the OS short or long course he must decide on which area of study he wishes to focus. He must also choose, or ask to be assigned, a member of the faculty knowledgeable in that area to be his academic advisor. If he opts for a subspecialty course, he would transfer into one of the current degree-with-specification programs. The choice of program option, and the area of study focus or subspecialty selected, would be submitted through the School to BUPERS for approval. A tentative list of the areas of study from which the student could choose is shown in Table III.

ORGANIZATION OF COURSES

The intent of the long and short OS program options is to introduce into the Navy's educational offerings a versatility consonant with the objectives

of OTMS. At the same time, however, it is necessary to assure depth and coherence in the studies pursued by each officer student. Meeting these objectives, and simultaneously accommodating variations in the academic interests and strengths of the officers themselves, demands controlled flexibility.

One element of controlled flexibility would be provided by the availability of different areas of study, as already postulated in Table III. A second element would be provided by the development of internally coherent course sequences, or "tracks", each of which might comprise 3 to 6 related subjects. A partial list of some of the tracks that might become available is provided in Table IV, together with the study areas (from Table III) to which each track would pertain.

Even though the possible areas are tentative and the list of possible tracks very incomplete, it is clear that many of the tracks pertain to several areas. It is also clear that more tracks would pertain to any particular area than could be fitted into a single student's schedule. Each OS curriculum student would be required to choose from among the set of tracks relevant to his study-area focus that subset which he will take. His academic and military counselors would provide advice, but the final decision should depend upon the student's personal motivations and career objectives. A variety of operational, technological, and managerial education mixes would result, together with high probability of pay-off through subsequent utilization in the case of each officer. In order to assure breadth of insight, it seems desirable to require, in addition, that long-course students take at least one track in each of three academic departments.

It is evident that the individual subjects comprising each track must differ somewhat from subjects aimed at conventional subspecialist education. The differences arise from two sources: the operational inclinations of the officer clientele to whom the education is addressed, and the implied retraction in the prerequisite structure. The effects will be greatest in the technological tracks, in which the OS educational objective is not design engineering, but rather the development of student insight into how the technology in application affects system operation and performance. With this change in objective, however, it appears feasible to develop self-contained tracks that can be taken independently without recourse to prerequisites beyond the common core. Table V contains three illustrative examples of tracks and possible constituent subjects.

The principal distinction between the long and short OS program options is the duration of the study tour. Excluding the six-week refresher it is anticipated that various students might devote four, five, or six quarters to the short course, and eight quarters to the long course. The principal distinction would be in the number of tracks taken, although depending on the internal prerequisite structure of particular tracks students in the short

course might also be unable to complete every subject in some tracks. In addition, long course students might be expected to participate in a group project during their last quarter or two. These projects should be aimed at developing and evaluating ways to improve a major Navy operating system in their area of study. To this end, it would be desirable to augment the faculty by a number of senior naval officers with significant personal experience with such systems to serve as project leaders, perhaps on a TDA basis.

IMPLEMENTATION WITH OTMS

The current set of restricted duty and subspecialist communities within OTMS has been listed in Table I. The problem of integrating the career management of officers graduated with (undesignated) master's degrees from the proposed OS program with the management of the existing subspecialties deserves consideration. Three possibilities come readily to mind, and will be discussed in the context of the Instruction* governing the subspecialty coding system.

The first possibility would be to augment the membership of the existing communities by the inclusion of new P-Codes specifically introduced to accommodate the outputs from the long-course OS program; a precedent exists in the establishment of the Operational System Technology codes, and their incorporation into the Systems Engineering community. Establishing a match between study areas and the established communities should not be difficult: for example, Command Information Systems would match with Operations Analysis/Automatic Data Processing, Ship Systems with Ship Engineering, Logistics with Material Support Management, and so forth. Advantages in this procedure would be minimal perturbation of the existing system and provision within each community of a spectrum of officers from engineers to operators. A disadvantage would be that the officer clientele for whom the proposed OS program is intended are just those unrestricted line officers to whom subspecialist education and the corresponding communities do not appeal.

The second possibility would be to augment the existing nineteen communities by a new one -- say, Operational Systems -- specifically designed to accommodate the OS program graduates. (Alternatively, they might all be accommodated in the Systems Engineering community.) To some extent this would alleviate the disadvantage of the first alternative, but is less consistent with the community delineations as presently conceived. This alternative, too, entails relatively minimal perturbation.

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*OPNAV Instruction 1211.6D, dated 8 Jan 73.

The third possibility would be to leave OS program graduates unidentified with any subspecialist community at all, other than the URL at large. Presumably, this would best reflect the inclinations of the officers to whom the program is primarily addressed, and would be appropriate for short-course (non-degree) graduates in any case. The validity of this approach hinges upon the OS program earning recognition as professional military education, analogous to Naval War College curricula and fully as relevant to increasing the effectiveness of naval operations. Certification of program completion would be entered into each graduate's personnel record, together with a code designating his study area.

Regardless of the community affiliation, utilization in the operating forces could be facilitated by preferential qualification statements in billet descriptions; for example, the job of Head of the Weapons Department might preferentially be filled by an officer who, in addition to appropriate fleet experience, had either studied in the weapons systems area or had a P-Code in Ordnance Engineering. As a minimum, it would be desirable to have at least one officer educated in each relevant area on each major ship. Given the development of OS programs of true professional worth, the Navy could look forward to a day in which completion of either a Naval War College curriculum, a master's program, or the OS program was a normal step in each career officer's professional development.

ANCILLARY BENEFITS

In addition to providing new educational opportunities for general line officers, two ancillary benefits may be expected to accrue from the proposed Operational Systems program. First, if elective freedom can be introduced into the existing subspecialty education programs, the OS tracks would provide coherent packages suitable for students interested in broadening their educational base. Second, these same tracks should also prove useful in a continuing education context, both because of their coherence and because of their ability to stand by themselves without prerequisites.

1. COMM MGT
2. OPS ANAL/ADP
3. PERS MGT
4. POL-MIL STRAT
5. FIN MGT
6. ELEX ENG
7. MATL SUPP MGT
8. AERO ENG
9. SHIP ENG
10. SYS ENG
11. PHYS SC
12. ENV SC
13. FAC ENG
14. PUB AFF
15. LEGAL
16. RELIG
17. HUM RES DEV
18. NURS
19. INT

TABLE I. CAREER MANAGEMENT COMMUNITIES
(JUNE 73)

Programming	Management
Calculus	Mechanics
Physics	Electrical Science
Government	Environmental Science

TABLE II. PROPOSED CORE

Anti-Submarine Warfare
Electronic Warfare
Anti-Air Warfare
Command Information Systems
System Test and Evaluation
Aeronautical Systems
Ship Systems
Communication Systems
Surveillance Systems
Environmental Analysis
Logistics
Weapon Systems

TABLE III. POSSIBLE AREAS OF STUDY FOCUS

	Command Info. Syst.	Syst. Test & Eval.	Aeronautical Syst.	.	.	.	Ship Syst.
Air/Sea Interface		x	x				x
Communications Technology	x						
Digital Signal Processing	x	x					
Control Technology			x				x
Structures			x				x
Heat Transfer			x				x
Hydrodynamics		x					x
Aerodynamics		x	x				
Turbomachinery			x				x
Rocket Propulsion			x				
Radar Technology	x		x				
Accounting & Budgeting			x				x
Design of Experiments	x	x					
Human Factors	x	x	x				x
Behavioral Science	x	x	x				x
Vibration & Noise		x					x
Underwater Sound	x	x					
Propellants & Explosives		x					
Statistical Analysis	x	x	x				x
Computer Systems	x	x	x				x
.							
.							
.							
Resource Allocation	x	x					

TABLE IV. PARTIAL LIST OF TRACKS AND PERTINENCE TO STUDY AREAS

Communication Technology

Linear Systems

Modulation & Detection

Antennas

Propagation

Statistical Communication Theory

Digital Signal Processing

Linear Systems

Digital Devices

Logic Circuits

Digital Filters

Behavioral Sciences

Group Behavior & Organization Theory

Individual Behavior

Personnel Selection & Classification

Personnel Performance Evaluation

TABLE V. ILLUSTRATIVE TRACK SEQUENCES

Appendix B

AN INVESTIGATION OF THE INCIDENCE OF GRADUATE EDUCATION AMONG NAVAL OFFICERS

INTRODUCTION

This investigation was conducted in an attempt to compare the absolute and proportionate stocks of Naval officers with graduate education over time. The years selected for investigation were 1939 (the pre-Second World War Navy), 1950 (the pre-Korean War Navy), 1964 (the pre-Vietnam acceleration Navy), and 1972 (the latest year for which data were available).

The results are entitled an "investigation" rather than a "comparison" for the simple reason that the Navies of these years and the officer stocks of these years are not comparable. Major areas of incomparability among officer stocks are as follows.

1. Designation. For the purposes of this investigation, certain designated officers are excluded, specifically, the various categories for health, law, religion, civil engineering, and supply. The remaining groups constitute our primary interest. However, they are designated differently in each of the years. The data have been examined on two bases: (a) the "line," and (b) the line plus the specialists not otherwise excluded. Explanations for each year are provided later.

2. Group size. The officer stock in 1939 was 6,966; the officer stock in 1972 was 45,700 or six and one-half times the size of the earlier group.

3. Rank structure. For the purposes of this investigation, officers in a rank normally attained after eight years of service are considered to be senior officers; those with less than eight years of service are considered to be junior officers. This classification was necessitated by the much longer periods of service required to advance in rank in the 1939 Navy than was the case in 1972. Eight years of service approximates the career point at which graduate education opportunity most prevails across the years included in this study. Using these definitions, the data for 1939 and 1972

reveal a dramatic proportionate increase in junior officers:

	1939	1972
Senior officers	4,198	16,828
Junior officers	2,768	28,872
Total	6,966	45,700

While the number of senior officers has quadrupled, the number of junior officers has increased tenfold. Any comparison of graduate educated officers as a percentage of total officer strength is grossly misleading if this rank structure change is ignored.

4. Education change. From 1939 through 1972, the graduate education of Naval officers has changed significantly in terms of duration, subject distribution, character, and level of recognized achievement. No simple method to adjust the data for these changes was found. No attempt was made to trace specific subjects or disciplines. It is recognized that the mix of graduate educated officers in terms of subject areas studied is controversial. This investigation deals with the occurrence of graduate education in aggregate and makes no subjective judgments about the relative importance of a technologically expert, managerially competent, or politically astute group of Naval officers.

Given the preceding outline of incomparable characteristics, findings from this investigation are stated cautiously and should be considered accordingly:

1. Based on the data examined, the current stock of senior Naval officers (LCDR and above) apparently is more educated than was the case in any of the earlier years examined.

2. Based on the rate at which the stock of graduate educated officers is accumulating, graduate educated officers are expected soon to constitute the majority of senior officers (LCDR and above) in the Navy.

This study examines the data for each of the selected years and then presents summary data for all years. All data are derived from hand counts of the Navy Register issued nearest 1 January of each of these years.

1939--THE NAVY BEFORE WORLD WAR II

The officers considered are the Line plus the Constructors Corps, since this Corps is composed of a high concentration of technical postgraduate educated officers. Because eight years of service were then required to make Lieutenant and because graduate education begins with that rank, Lieutenants are included with the senior officers in the tabulated data.

The Navy stock of officers before World War II was small, but had a very substantial incidence of postgraduate education. The Flag officers and Captains passed the prime career period in which to receive graduate education during and shortly after World War I and have a lower incidence of graduate education. The Commanders, Lt. Commanders, and Lieutenants reflect the major growth of the Naval Postgraduate School between the wars. The data are presented in Table 1.

1950--THE NAVY BEFORE THE KOREAN WAR

The officers considered are the Line. (There were no technically oriented Corps officers comparable to the Constructors Corps, and the various engineering and special duty officers who compose the Restricted Line today were not grouped separately in the 1950 Register.)

The Navy stock of officers before the Korean War was nearly four times larger than in 1939. The pre-World War II educated stock has advanced to Flag and Captain ranks by 1950. The World War II period and the subsequent turbulence of the late 1940's reduced the incidence of graduate educated officers in the ranks of Commander and Lt. Commander. In absolute terms, the senior officer stock with graduate education in 1950 was 30 percent greater than in 1939. The data are presented in Table 2.

1964--THE NAVY BEFORE THE VIETNAM ACCELERATION

The officers considered are the Unrestricted Line plus the Restricted Line. The many other designations used by 1964 (TAR, LDO, etc.) are not included. The data are tabulated for URL and RL without achievement level in Table 3. The graduate educated officers are further tabulated in

terms of no degree and Master's degree achievement levels in Table 4.

The Navy stock of officers before Vietnam is nearly twice the number in 1950 and seven times the number in 1939. The number of graduate educated officers in 1964 (6,157) is nearly as large as the total number of officers in 1939 (6,966). The major characteristic of the 1964 stock of officers is the emergence of a significant number with Master's degrees. The data are provided in Tables 3 and 4.

1972--THE NAVY TODAY

The officers considered are the Unrestricted Line plus the Restricted Line. As in 1964, many other designations are not included. The major characteristics of the 1972 stock of officers are:

1. A smaller number of officers than in 1964. It should be recalled that the 1950 stock was four times larger than that in 1939 and that the 1964 stock was almost double that in 1950.

2. A dominance of Master's degrees among graduate educated officers.

The data are tabulated for URL and RL without achievement level in Table 5. The graduate educated officers are further tabulated in terms of no degree and Master's degree achievement levels in Table 6.

The Navy stock of officers in 1972 reflects the results of graduate education provided mainly since the Korean War. The number with Master's degrees has doubled since 1964, while the number without degrees has remained stable. The data are presented in Tables 5 and 6.

TRENDS OVER TIME

Despite the various factors discussed above which mitigate against comparison over time, it is recognized that comparison will be made. Tables 7 and 8 display the data for the four years on the basis of the Unrestricted Line (Table 7) and the Unrestricted Line plus the Restricted Line (Table 8). Each table shows the number of officers with graduate education and the percentage of total strength with

graduate education. The number of officers indicates the size of the nucleus available for critical assignments and available as an expansion base in a major emergency period. The percentage of officers indicates the extent to which graduate education is characteristic of officers at various ranks. Data in Tables 7 and 8 are not comparable.

CONCLUSIONS

Despite the difficulties that exist in comparing the Navy stock of graduate educated officers for these years, conclusions can be drawn cautiously which appear reasonable.

1. The current stock of senior Naval officers (LCDR and above) apparently is more educated than was the case in any of the earlier years examined. Numerically, the largest number with graduate education prevails today. The number with Master's degrees in 1972 almost exceeds the entire stock of officers in 1939. The incidence of graduate education is much higher among Flag rank officers and Captains today. To the extent that degrees can be considered a measure of quality, it is notable that the Master's degree dominates graduate education of officers today. The percentage of senior officers with graduate education today approximates the percentages which prevailed in 1939--a Navy less than one-sixth the size of the Navy today.

2. The distinction between "senior" or "junior" officers in terms of years of service is important in the consideration of graduate educated stocks of officers. The investment in graduate education is concentrated on those who are expected to succeed as career officers. Further, measurement of the incidence of graduate education among senior officers allows time for the educational tour to have occurred. The stock of career officers (LCDR and above) is a preferable measure than measures (percentage or otherwise) based on total strength. Furthermore, the use of percentages based on total strength can be misleading and detrimental. Percentages ranging from 9% to 28% (Tables 7 and 8) could lead the mid-career officer to underestimate the importance of graduate education to his career. The important information for both such officers and Navy leadership is the high incidence of graduate education in the senior ranks.

3. Unlike 1939, 1950, and 1964, which are all years immediately prior to the start of wars, 1972 is a year near the end of a war. Barring a major emergency, a period of

reduction and adjustment is planned. Thus, the 1970's are a period in which the stock of graduate educated officers should cumulate rather than be diluted by wartime expansion. An examination of Tables 5 through 8 indicates how rapidly the numbers of graduate educated officers are accumulating. Thus, graduate educated officers are expected soon to constitute the majority of senior officers (LCDR and above) in the Navy. It is estimated that this status will be reached not later than the beginning of 1976. With the shift from minority to majority status, the graduate educated officer will become more the model than the exception in the Navy in the future.

TABLE 1

AN ANALYSIS OF GRADUATE EDUCATED NAVAL OFFICERS
BY RANK AND DESIGNATION, 1939

Rank	Line			Constructors Corps			Total		
	GE[1]	Total[2]	% GE	GE[1]	Total[2]	% GE	GE[1]	Total[2]	% GE
Flag	16	77	21%	1	1	100%	17	78	22%
CAPT	66	314	21	24	24	100	90	338	27
CDR	252	638	39	42	46	91	294	684	43
LCDR	601	1,363	44	44	59	75	645	1,422	45
LT	775	1,626	48	50	50	100	825	1,676	49
Subtotal	1,710	4,018	43%	161	180	89%	1,871	4,198	45%
LTJG	36	1,602	2%	21	34	62%	57	1,636	3%
ENS	0	1,132	--	0	0	0	0	1,132	--
Subtotal	36	2,734	1%	21	34	62%	57	2,768	2%
TOTAL	1,746	6,752	26%	182	214	85%	1,928	6,966	28%

[1]Graduate Educated
[2]Total strength, with or without graduate education

TABLE 2

AN ANALYSIS OF GRADUATE EDUCATED NAVAL OFFICERS
BY RANK, 1950

Rank	Graduate Educated	Total[1]	% Graduate Educated
Flag	86	204	42%
CAPT	978	1,807	54
CDR	640	2,903	22
LCDR	524	4,879	11
Subtotal	2,228	9,793	23%
LT	226	7,707	3%
LTJG	49	6,411	1
ENS	6	2,811	--
Subtotal	281	16,929	2%
TOTAL	2,509	26,722	9%

[1]Total strength, with or without graduate education

TABLE 3

AN ANALYSIS OF GRADUATE EDUCATED NAVAL OFFICERS
BY RANK AND DESIGNATION, 1964

Rank	Unrestricted Line			Restricted Line			Total		
	GE[1]	Total[2]	% GE	GE[1]	Total[2]	% GE	GE[1]	Total[2]	% GE
Flag	72	216	33%	24	26	92%	96	242	40%
CAPT	691	2,257	31	323	383	84	1,014	2,640	38
CDR	1,190	4,806	25	409	539	76	1,599	5,345	30
LCDR	1,501	7,040	21	431	567	76	1,932	7,607	25
Subtotal	3,454	14,319	24%	1,187	1,515	78%	4,641	15,834	29%
LT	816	10,212	8%	150	392	38%	966	10,604	9%
LTJG	312	12,384	3	20	117	17	332	12,501	3
ENS	209	8,514	2	9	87	10	218	8,601	3
Subtotal	1,337	31,110	4%	179	596	30%	1,516	31,706	5%
TOTAL	4,791	45,429	11%	1,366	2,111	65%	6,157	47,540	13%

[1]Graduate Educated
[2]Total strength, with or without graduate education

TABLE 4

AN ANALYSIS OF GRADUATE EDUCATED NAVAL OFFICERS
BY RANK, DESIGNATION, AND DEGREE STATUS, 1964

Rank	Unrestricted Line			Restricted Line			Total		
	Master's or Better	No Degree	Total GE[1]	Master's or Better	No Degree	Total GE[1]	Master's or Better	No Degree	Total GE[1]
Flag	32	40	72	22	2	24	54	42	96
CAPT	454	237	691	246	77	323	700	314	1,014
CDR	587	603	1,190	304	105	409	891	708	1,599
LCDR	635	866	1,501	323	108	431	958	974	1,932
Subtotal	1,708	1,746	3,454	895	292	1,187	2,603	2,038	4,641
LT	279	537	816	97	53	150	376	590	966
LTJG	170	142	312	17	3	20	187	145	332
ENS	130	79	209	6	3	9	136	82	218
Subtotal	579	758	1,337	120	59	179	699	817	1,516
TOTAL	2,287	2,504	4,791	1,015	351	1,366	3,302	2,855	6,157

[1]Graduate Educated

TABLE 5

AN ANALYSIS OF GRADUATE EDUCATED NAVAL OFFICERS
BY RANK AND DESIGNATION, 1972

Rank	Unrestricted Line			Restricted Line			Total		
	GE[1]	Total[2]	% GE	GE[1]	Total[2]	% GE	GE[1]	Total[2]	% GE
Flag	119	230	52%	25	28	89%	144	258	56%
CAPT	1,220	2,438	50	373	417	89	1,593	2,855	56
CDR	2,192	5,094	43	669	834	80	2,861	5,928	48
LCDR	1,959	6,534	30	821	1,253	66	2,778	7,787	36
Subtotal	5,488	14,296	38%	1,888	2,532	75%	7,376	16,828	44%
LT	927	11,017	8%	256	849	30%	1,183	11,866	10%
LTJG	676	10,220	7	99	475	21	775	10,695	7
ENS	208	6,010	3	46	301	15	254	6,311	4
Subtotal	1,811	27,247	7%	401	1,625	25%	2,212	28,872	8%
TOTAL	7,299	41,543	18%	2,289	4,157	55%	9,588	45,700	21%

[1]Graduate Educated
[2]Total strength, with or without graduate education

TABLE 6

AN ANALYSIS OF GRADUATE EDUCATED NAVAL OFFICERS
BY RANK, DESIGNATION, AND DEGREE STATUS, 1972

Rank	Unrestricted Line			Restricted Line			Total		
	Master's or Better	No Degree	Total GE[1]	Master's or Better	No Degree	Total GE[1]	Master's or Better	No Degree	Total GE[1]
Flag	98	21	119	22	3	25	120	24	144
CAPT	919	301	1,220	304	69	373	1,223	370	1,593
CDR	1,315	877	2,192	515	154	669	1,830	1,031	2,861
LCDR	1,165	792	1,957	616	205	821	1,781	997	2,778
Subtotal	3,497	1,991	5,488	1,457	431	1,888	4,954	2,422	7,376
LT	706	221	927	185	71	256	891	292	1,183
LTJG	558	118	676	81	18	99	639	136	775
ENS	158	50	208	37	9	46	195	59	254
Subtotal	1,422	389	1,811	303	98	401	1,725	487	2,212
TOTAL	4,919	2,380	7,299	1,760	529	2,289	6,679	2,909	9,588

[1]Graduate Educated

TABLE 7

NAVAL OFFICERS WITH GRADUATE EDUCATION--1939, 1950, 1964, AND 1972
"THE UNRESTRICTED LINE"

Rank	Number of Officers				Percent of Total Strengtn			
	1939	1950	1964	1972	1939	1950	1964	1972
Flag	16	86	72	119	21%	42%	33%	52%
CAPT	66	978	691	1,220	21	54	31	50
CDR	252	640	1,190	2,192	39	22	25	43
LCDR	601	524	1,501	1,957	44	11	21	30
LT	775				48			
Subtotal	1,710	2,228	3,454	5,488	43%	23%	24%	38%
LT		226	816	927		3%	8%	8%
LTJG	36	49	312	676	2%	1	3	7
ENS	0	6	209	208	0	0	2	3
Subtotal	36	281	1,337	1,811	1%	2%	4%	7%
TOTAL	1,746	2,509	4,791	7,299	26%	9%	11%	18%

TABLE 8

NAVAL OFFICERS WITH GRADUATE EDUCATION--1939, 1950, 1964 AND 1972
"THE UNRESTRICTED AND RESTRICTED LINE"

Rank	Number of Officers				Percent of Total Strength			
	1939	1950	1964	1972	1939	1950	1964	1972
Flag	17	86	96	144	22%	42%	40%	56%
CAPT	90	978	1,014	1,593	27	54	38	56
CDR	294	640	1,599	2,861	43	22	30	48
LCDR	645	524	1,932	2,778	45	11	25	36
LT	825				49			
Subtotal	1,871	2,228	4,641	7,376	45%	23%	29%	44%
LT		226	966	1,183		3%	9%	10%
LTJG	57	49	332	775	3%	1	3	7
ENS	0	6	218	254	0	0	3	4
Subtotal	57	281	1,516	2,212	2%	2%	5%	8%
TOTAL	1,928	2,509	6,157	9,588	28%	9%	13%	21%

A NOTE REGARDING SOURCES

1. All data have been obtained from the Navy Register as of 1 July, 1939, 1 January, 1950, 1 January, 1964, and 31 December, 1971.

2. In each year, data for Navy line and "specialist" officers have been included in the analyses. Designations and numbers of officers included and excluded from these analyses are shown below for each year.

1939

Included:	
Line	6,752
Constructors Corps	214
Subtotal	6,966
Excluded:	
Supply Corps	562
Civil Engineers Corps	126
Medical Corps	841
Dental Corps	255
Chaplains	91
Subtotal	1,875
TOTAL	8,841

1950

Included:	
Line	26,722
Excluded:	
Supply Corps	2,994
Civil Engineers Corps	730
Medical Corps	1,574
Dental Corps	755
Chaplains	349
Medical Service Corps	605
Nurse Corps	1,633
Subtotal	8,640
TOTAL	35,362

1964

Included:	
Unrestricted Line	45,429
Engineer, General & Ordnance	967
Aero Engineer & Meteorology	501
Communications	370
Intelligence	188
Photography	6
Public Information	69
Hydrography	10
Subtotal	47,540
Excluded:	
Limited Duty--Line	6,876
Line--TAR	1,360
Line Women	336
Line USNR & TAR Women	136
Law	547
Medical	3,542
Medical--TAR	1
Supply	4,643
Supply--Limited Duty	611
Supply--TAR	43
Supply--Women	22
Supply--USNR & TAR Women	17
Chaplain	921
Civil Engineers	1,494
Civil Engineers--Limited Duty	103
Civil Engineers--TAR	22
Dental	1,731
Dental--TAR	3
Medical Service	1,219
Nurse	2,020
Nurse--TAR	4
Subtotal	25,651
TOTAL	73,191

1972 (31 December, 1971)

Included:	
Unrestricted Line	41,543
Engineering Duty	1,222
Aero Engineering Duty	389
Aviation Maintenance Duty	330
Cryptology	601
Intelligence	1,037
Photography	3
Public Affairs	146
Geophysics	303
Ordnance Engineer	126
Subtotal	45,700
Excluded:	
Limited Duty--Line	3,979
Line--TAR	1,527
Line--Women	665
Medical	4,517
Supply	4,574
Supply--Limited Duty	306
Supply--TAR	67
Supply--Women	16
Supply--Women USNR	5
Chaplain	955
Civil Engineer	1,690
Civil Engineer--Limited Duty	71
Judge Advocate	730
Dental	1,796
Medical Service	1,596
Nurse	2,286
Subtotal	24,780
TOTAL	70,480

3. In each year, the educational codes shown in the Register for that year are utilized. Specific codes for each year are given below.

1939

"Courses and Qualifications"

21. Completed postgraduate course in general line duties.
22. Completed postgraduate course in mechanical engineering.
22a. Completed postgraduate course in diesel engineering.
22b. Completed postgraduate course in metallurgical engineering.
22c. Completed postgraduate course in petroleum engineering.
22d. Completed postgraduate course in gas engineering.
22e. Completed postgraduate course in naval engineering (design).
22f. Completed postgraduate course in naval engineering (operating).
23. Completed postgraduate course in electrical engineering.
24. Completed postgraduate course in radio engineering.
24a. Completed postgraduate course in communications.
25. Completed postgraduate course in aeronautical engineering.
26. Completed postgraduate course in ordnance engineering (general).
26a. Completed postgraduate course in ordnance engineering (aviation).
26b. Completed postgraduate course in ordnance engineering (torpedoes).
26c. Completed postgraduate course in ordnance engineering (explosives).
26d. Completed postgraduate course in ordnance engineering (metallurgy).
26e. Completed postgraduate course in ordnance engineering (fuses).
26f. Completed postgraduate course in ordnance engineering (mines).
27. Completed postgraduate course in aerology.
27a. Completed 2-year course in aerology.
28. Completed postgraduate course in compass design.
29. Completed postgraduate course in law under supervision of office of J.A.G., and holds degree in law.
29a. Completed postgraduate course in international law and relations.
29b. Holds degree in law.
57. Completed 2-year postgraduate course in business administration.
57a. Completed 1-year postgraduate course in business administration.

65. Completed course in naval architecture, Royal Naval College, Greenwich, England.
66. Completed course in naval architecture, University of Glasgow, Scotland.
67. Completed course in naval architecture and marine engineering, École d'Application de Maritime, Paris, France.
68. Completed course in naval architecture at Massachusetts Institute of Technology.
69. Completed course in Electrotechnique l'École Superieure d'Électricité, Paris, France.
70. Completed advanced course in naval architecture, Technische Hochschule, Berlin, Germany.
73. Holds degree of Doctor of Science.
74. Holds degree of Doctor of Engineering.
77. Completed postgraduate course in naval architecture and marine engineering, Regia Universita di Genova, Genoa, Italy.

1950

"Special Qualifications"

24. PG Advanced Science, Applied Mathematics.
25. PG Advanced Science, Chemistry.
26. PG Aerological Engineering.
27. PG Aeronautical Engineering.
28. PG Applied Aerology.
29. PG Applied Communications.
30. PG Business Administration.
31. PG Civil Engineering.
32. PG Combined Naval Construction and Engineering.
33. PG Diesel Engineering.
34. PG Electronics Engineering.
35. PG General Line.
36. PG International Law.
37. PG Law.
38. PG Management and Industrial Engineering.
39. PG Naval Administration, Island Government.
40. PG Naval Construction.
41. PG Naval Engineering.
42. PG Oceanography.
43. PG Ordnance Engineering.
44. PG Ordnance Engineering (USNR).
45. PG Personnel Administration.
46. PG Religion.
47. PG Textile Engineering.
48. Rhodes Scholars.

1964

"Graduate Education Level"

1. Doctor's Degree.
2. Master's Degree.
3. Postgraduate study, no advanced degree awarded. This includes all Navy-sponsored postgraduate education not covered by codes 1 or 2, non-Navy sponsored education of at least 18 semester hours toward an advanced degree beyond the bachelor's degree, and certain advanced medical service nursing and theological education not otherwise covered.

1972 (31 December, 1971)

"Graduate Education Level"

1. Doctorate.
2. Law degree (LL.B., J.D.) not covered by 1 and 4. Includes Navy-sponsored postgraduate law programs, no advanced degree awarded.
3. Post-master's degree. Includes degrees beyond the master's, but less than the doctoral level, e.g., Degree of Engineer, Degree of Education Specialist.
4. Master's degree.
5. Postgraduate study, no advanced degree awarded. Includes all Navy-sponsored postgraduate education not covered by codes 1, 2,3, or 4; non-Navy sponsored education of at least 18 semester hours toward an advanced degree beyond the baccelaureate; 2 or more years of law, no degree; and certain advanced medical service, nursing and theological education not otherwise covered.

Appendix C

SURVEY DATA

This appendix contains data extracted from the analyses of four recent questionnaire surveys of officer populations involved in the postgraduate education system. By no means is all of the relevant data included here; an attempt has been made, however, to extract those data elements most germane to understanding and appraisal of the system. A conscientious effort has been made to avoid biasing the data selection to support any particular viewpoints or preconceptions.

The first set of data was provided informally, and represents advance information from a survey conducted by DOD of officers with graduate degrees in all of the military departments. The second comes from an NPS master's thesis, "Opinion Survey of Naval Officers Who Have Received A Navy Sponsored Graduate Degree," by LCDR C. R. Hurst, Jr. and LT J. D. Shaddix, June 1973. The third set of data results from a survey of on-board students conducted by the Graduate Education Study Committee, with the assistance of the NPS Student Council. The final data comes from a survey entitled "Motivational Factors of Students Selected for Technical Curricula at the Naval Postgraduate School." This work, dated December 1972, was carried out while they were students at NPS by ENS C. S. Sharrocks, Jr. and LTJG S. L. McIntyre, at the request of the Deputy Director of Programs.

1. DOD Survey of Military Graduate Education

A survey was made by the Office of the Assistant Secretary of Defense (Manpower and Reserve Affairs) in January 1973 of officers in all services who had graduate degrees. Pertinent questions and preliminary results are summarized below, for naval officer respondents only.

a. Considering your advanced degree in the light of present personnel turmoil, how do you feel your career is being managed?

%		
45.5	A.	My assignments have been carefully managed to optimize my contribution
32.7	B.	My assignments could have been better managed
21.8	C.	My assignments were managed poorly
--	D.	My assignments appear to have not been managed at all

b. Are you currently assigned to a position which your service has designated as requiring an advanced degree?

%		
39.2	A.	Yes
60.8	B.	No

c. Assuming that your service job required graduate level training, but was not designated as requiring an advanced degree, would you have been willing to participate in graduate education programs which did not result in the awarding of an advanced degree?

%		
32.6	A.	Yes, the shorter course would have served as well. The graduate degree was not essential
67.4	B.	No, the degree is an essential element of graduate education

d. VA benefits (GI Bill) are available for use while in service. Would you have been willing to use these benefits to finance your graduate education?*

%		
12.8	A.	I did not participate in any graduate education while in service
13.9	B.	I used VA benefits and had no objection
4.4	C.	I used VA benefits but would have preferred not to
29.0	D.	I did not use VA benefits but would not have minded using them
27.5	E.	I did not use VA benefits but would have if required by my service
12.4	F.	I did not use VA benefits and would not have attended graduate school while in the service if required to use them

*Data merged for all services, rather than Navy only.

e. When assigned to the most recent job which your service designated as requiring an advanced degree, how useful was your advanced training?

A. I have not had such an assignment

*I have had such an assignment and:

%		
94.4	B.	the degree was extremely useful and I could not have performed without it
	C.	the advanced degree was useful but not essential
5.6	D.	the advanced degree was not useful at all
	E.	the advanced degree was an encumbrance
	F.	the advanced degree was not appropriate to the job

f. Do you feel your advanced degree significantly enhanced your performance in those assignments which were <u>not</u> designated "graduate degree essential" jobs?

%		
42.8	A.	In virtually all such assignments
23.5	B.	More than half the time
20.2	C.	Less than half the time
13.6	D.	Virtually never
	E.	Never had such an assignment

g. As a result of obtaining your advanced degree, what were your service career plans?

%		
5.5/47.2/6.6	A.	Undecided about a service career
41.0/8.7/32.0	B.	Fairly sure I would stay in for minimum retirement
45.9/11.7/59.3	C.	Fairly sure I would stay in as long as I can
2.5/32.4/2.1	D.	Fairly sure I would get out prior to retirement

Responses sorted by (Fully funded/Pre service/In service other)

h. How useful do you feel your advanced degree has been in terms of making you a more effective officer/leader/manager?

%		
57.5/46.2/47.3	A.	Extremely useful
37.9/45.6/46.5	B.	Somewhat useful
	C.	Of no use
4.6/7.8/6.2	D.	Somewhat negative effect
	E.	Extremely negative effect

Responses sorted by (Civ. school, funded/Mil school/In service, other)

i. Based upon your observations, in terms of competence and professionalism, how well do officers with an advanced degree compare to their peers who do not possess an advanced degree?

%		
--	A.	They are about the same as their peers in terms of technical competence and professionalism
45.7	B.	They are slightly above average in terms of competence and professionalism
39.6	C.	They are markedly above average in terms of competence and professionalism
14.6	D.	They are slightly below average in terms of competence and professionalism
	E.	They are markedly below average in terms of competence and professionalism

j. What do you think of the current advanced educational opportunities in your service?

%		
85.0	A.	More than adequate
	B.	Adequate
15.0	C.	Not adequate

k. In terms of the future demands placed on officers of your service, what do you feel will be the need for graduate educated officers?

%		
4.1	A.	There will be a decreasing need
32.9	B.	The need will remain about the same
63.0	C.	There will be an increasing need

l. How did the consideration of a projected second career after leaving the service figure into your graduate education plans?

%		
19.2	A.	I gave no thought to second career plans
35.8	B.	Second career plans were secondary
30.1	C.	Second career and active duty plans were equally important
10.7	D.	Second career plans were a primary consideration
4.8	E.	I have no second career plans

2. Naval Officers Who Have Received a Navy Sponsored Graduate Degree

A survey was made at NPS during the first half of 1973 of a random 25% sample of the 2917 officer graduates of NPS and the 2148 officer graduates of civilian universities who were then on active duty. A total of 875 (out of 1265) responses were received, but only 826 in time to be included in the analysis. A summary of important findings and a reprint of some of the data tables follows.

a. Timing of Education

Most naval officers (70.9%) with a graduate degree think a graduate education should be obtained during the 5 - 8 year point in their career whereas only 38.6% actually attended graduate school during this period.

b. Satisfaction with School

Graduates of the Naval Postgraduate School considered it to be equivalent to civilian schools, whereas graduates of civilian schools considered their school to be superior to the Naval Postgraduate School. There were no significant differences, however, between their opinions concerning course and instructor excellence, the degree of academic difficulty, and the effects on social/family life at their respective schools.

c. Career Intention

Of the officers who have received a graduate degree, 96.7% intend to remain on active duty for at least 20 years and 72.5% intend to remain on active duty in excess of 20 years. However, it is noted that 32.1% have already completed at least 19 years commissioned service. Of those officers who have eight years or less commissioned service, 79% intend to remain in the Navy for at least 20 years.

d. Effect on Retention

The availability of graduate education was a positive influence on officers' decisions to remain in the Navy. Of the officers who attended graduate school with six years or less commissioned service, 68% indicated that it was a positive influence on their decision while only 34% indicated

that it had no effect. This positive influence increases to the 7 - 8 year point, then decreases as a function of years of commissioned service completed. This is expected since an officer with more than eight years service has probably already made his career decision.

e. Why Do Naval Officers Seek Graduate Education?

There are many reasons why officers seek a graduate education. The reason given by officers most frequently (39.4%) was to remain competitive with contemporaries for further assignments and promotions (ticket punching). As shown in Table 5, significantly fewer officers were of the opinion that the primary reason for seeking graduate education is to become a more capable officer (26.7%), and to fulfill their educational aspirations (24.4%).

The percentage of officers who desired "To become a more capable naval officer" increased with rank, while those who desired "To fulfill personal educational aspirations" decreased with rank as shown in Table 5.

Table 5. Reasons for Seeking Graduate Education by Rank

	LTJG	LT	LCDR	CDR	CAPT	RADM	VADM	TOTAL
Ticket Punching	38.5 5	41.7 25	43.9 136	37.2 93	35.9 60	18.8 3	0.0 0	39.4 322
More Capable Officer	0.0 0	6.7 4	19.7 61	30.4 76	39.5 66	62.5 10	100 1	26.7 218
Change Designator	0.0 0	1.7 1	0.3 1	0.0 0	1.8 3	0.0 0	0.0 0	0.6 5
Procure P-code	0.0 0	0.2 2	0.4 3	0.2 2	0.0 0	0.0 0	0.0 0	0.9 7
Retirement Employment	15.4 2	8.3 5	11.0 34	8.0 20	3.0 5	0.0 0	0.0 0	8.1 66
Educational Aspirations	46.2 6	38.3 23	24.2 75	23.6 59	19.8 33	18.8 3	0.0 0	24.4 199
TOTAL	1.6 13	7.3 60	37.9 310	30.6 250	20.4 167	2.0 16	0.1 1	100 817

Missing Observations: 9

f. Choice of Curriculum

To fulfill the educational requirements of the Navy, a small percentage (13.3%)of officers attend graduate school in a curriculum other than their choice.

g. Fitness Reports for Graduate Students

The frequency and percentage of responses as to how selection boards for promotion should consider fitness reports received from graduate schools is shown in Table 7.

These data indicate that 82.7% of the officers who have received a graduate degree believe that fitness reports received from graduate schools should not be regarded as equivalent to fitness reports received from operational/shore billets. Neither do officers desire that their fitness reports be marked "Not Observed" but apparently desire some weighting between these two extremes.

Table 7. Fitness Reports

	N	Percentage
Equivalent to Operational/Shore Billet Fitness Reports	142	17.2
Special Assignment, Little Emphasis on Professional Ratings Assigned	292	35.4
Special Assignment, Emphasis Only on Grade Point Average	153	18.5
"Not Observed" and Submitted for Record Purposes Only	238	28.8
TOTAL	825	100

Missing Observations: 1

h. Curriculum Structure

Significantly more officers who have attended civilian schools considered that their curriculum was broadly structured allowing for numerous electives, or was well balanced, than those who attended Naval

Postgraduate School. However, considering only the officers who attended Naval Postgraduate School there was no significant difference between those who considered their curriculum narrowly structured (51.5%) and the combined percentage of those who considered their curriculum broadly structured or well balanced (48.5%).

Table 11. Curriculum Structure

	NPS	Civilian
Broadly Structured	13.0 61	29.9 105
Narrowly Structured	51.5 241	31.3 110
Well Balanced	35.5 166	38.8 136

i. Technical Obsolescence

Of the officers responding, 84.4% considered that failure to be assigned to a P-coded billet for officers completing a technical curriculum would result in the subject matter learned becoming obsolete unless the officer maintains currency on an individual basis. Within this 84.4%, 64.3% believe an officer's knowledge will be obsolete within four years while 87.4% believe within six years.

An analysis of those officers completing a technical curriculum shows that 13% think they will never be obsolete. This is not significantly different from the 15.6% of the entire sample who selected the "Never" category.

j. School Administration

The majority of officers considered that their school administration was efficient and helpful to some degree.

Table 12. School Administration

	NPS	Civilian
Very Efficient and Helpful	26.4 124	47.2 166
Efficient and Helpful	69.7 327	50.5 178
Inefficient and Uncooperative	3.9 18	2.3 8

k. Necessity of Graduate Education in P-coded Billets

To effectively perform assigned duties in P-coded billets, a graduate education was considered necessary by 32% of those who had been assigned a P-coded billet. Those who considered a graduate education to be necessary or desirable and had also been assigned a P-coded billet amounted to 86.6%. There was no significant difference among the various curricula.

Table 19. Necessity of Graduate Education by Those Assigned P-coded Billets

	N	Percentage
Graduate Education in That Specialty was a Necessity	154	27.1
Any Graduate Education Was a Necessity	28	4.9
Graduate Education in That Specialty Was Desirable	276	48.5
Any Graduate Education Was Desirable	35	6.2
Undergraduate Education in That Specialty Would Have Been Equally Effective	52	9.1
Any Undergraduate Education Would Have been Equally Effective	24	4.2
TOTAL	569	100

Missing Observations: 8

1. Desirability of P-coded Billets

The percentage of officers who desire an assignment to a P-coded billet was considerably higher than those not desiring an assignment to a P-coded billet. Of the officers who had been assigned to a P-coded billet 85.7% desired to be reassigned to another P-coded billet. Of those who had not been assigned to a P-coded billet 70.3% desired to be assigned to a P-coded billet. As can be seen from Table 22 there are significant differences among the three communities of officers. The percentage of those in the unrestricted line community that have been assigned and desire reassignment is significantly less than those in the other communities.

Table 22. Desirability of P-coded Billets

	URL	RL	STAFF
Have Been Assigned a P-coded Billet and Desire Reassignment to Another P-Coded Billet	42.1 150	69.7 122	61.8 165
Have Been Assigned and Do Not Desire Reassignment to Another P-coded Billet	12.1 43	4.5 8	8.6 23
Have Not Been Assigned a P-coded Billet But Desire to Be So Assigned	32.9 117	17.7 31	20.2 54
Have Not Been Assigned a P-coded Billet and Do Not Desire to Be So Assigned	12.9 46	7.8 14	9.4 25
TOTAL	100.0 356	100.0 175	100.0 267

Missing Observations: URL 6; RL 4; STAFF 7

m. Assignments to P-coded Billets

Of the officers who have received a Navy sponsored graduate education, 68.6% have been assigned to a P-coded billet. There was no significant difference between technical and non-technical curricula. Of the officers who have been assigned a P-coded billet 57.6% were assigned immediately upon completion of their graduate education and 89.1% were assigned within four years after obtaining a graduate education as shown in Table 23.

It was determined from the difference of the years of commissioned service when graduated and the present years of commissioned service completed that 42.8% (110) of the officers who have not been assigned to a P-coded billet graduated more than four years ago. This could mean that these officers have little chance to be assigned a P-coded billet in the future.

Table 23. When Assigned to P-coded Billets

Years After Graduation	N	Percentage
Immediately	328	40.1
1 - 2	79	9.7
3 - 4	100	12.2
5 - 6	26	3.2
7 - 8	15	1.8
9 - 10	8	1.0
11 - Later	5	0.6
Never	257	31.4
TOTAL	818	100

Missing Observations: 8

n. Utilization

Although 22.5% indicated they have never used their graduate education in other than P-coded billets, only 8% (n = 65) of the total sample (N = 826) indicated they haven't used their graduate education in either P-coded billets or other billets. Extensive and frequent utilization of graduate education in other than P-coded billets increases with rank as shown in Table 21.

Table 21. Utilization of Graduate Education By Rank

	Extensively and Frequently	Occasionally	Never	Total
LTJG	21.4 3	28.6 4	50.0 7	100.0 14
LT	36.2 21	31.0 18	32.8 19	100.0 58
LCDR	37.8 115	33.9 103	28.3 86	100.0 304
CDR	46.6 116	32.9 82	20.5 51	100.0 249
CAPT	61.1 104	27.1 46	11.8 20	100.0 170
RADM	82.3 14	17.6 3	0.0 0	99.9 17
VADM	100.0 2	0.0 0	0.0 0	100.0 2
TOTAL	46.1 375	31.4 256	22.5 183	100.0 814

Missing Observations: 12

o. Effect on Promotions

As shown in Table 27, a significantly smaller percentage of officers in the unrestricted line community consider their graduate education was a positive factor in their promotions than those of the other communities.

Table 27. Effect on Promotions By Communities

	URL	RL	STAFF	TOTAL
Early; Helpful	8.6 26	4.3 7	10.4 21	8.0 54
Early; No Effect	4.0 12	1.2 2	4.5 9	3.5 23
Early; Hurt	0.0 0	0.6 1	0.0 0	0.2 1
On Time; Helpful	38.6 117	63.8 102	52.0 105	48.7 324
On Time; No Effect	38.9 118	21.3 34	26.2 53	30.8 205
On Time; Hurt	3.0 9	0.6 1	1.5 3	1.0 13
Failed; No Effect	4.3 13	6.3 10	4.5 9	4.8 32
Failed; Hurt	2.6 8	1.9 3	0.9 2	2.0 13
TOTAL	100.0 303	100.0 160	100.0 202	100.0 665

Not Eligible: URL 59; RL 19; STAFF 72
Missing Observations: 0
Missing Designators: 11

p. Methods of Maintaining Proficiency

A majority (79.2%) of officers say they have kept current in the area in which they obtained their graduate degree. The percentage of graduates of technical curricula who have not kept current (29%) was significantly larger than the graduates of non-technical curricula (13.3%). Of the 29% in the technical curricula who have not kept current, 41.7% have not been assigned a P-coded billet while 61.1% of the 13.3% in the non-technical curricula have not been assigned.

3. U. S. Officer Graduate Students at Naval Postgraduate School

A survey was made at NPS during the Spring of 1973 of all 1070 United States officers then pursuing graduate studies at the School. A total of 753 responses were received. All responses (except in the last two instances, labelled "u" and "v" below) were answered on a nine-point scale. In the extract from the data presented below, the following mapping of the response scale has been used:

very positive significant positive positive	positive, or agreement
minor positive none minor negative	nugatory
negative significant negative very negative	negative, or disagreement

a. 75.7% responded that their attendance at NPS was having a positive influence on their ability to use analytical problem solving techniques.

b. 61.8% felt similarly about their overall professional ability.

c. 42.0% felt similarly about their promotion potential due to "ticket punch."

d. 36.8% felt similarly about their promotion potential due to personal changes.

e. 69.4% felt similarly about their second career potential. 90.4% of those with QPR's greater than 3.64 held this view.

f. 30.5% felt similarly about their desire to pursue a new career path. 54.2% of those with QPR's greater than 3.64 held this view.

g. 56.2% felt similarly about their lasting interest in present field of study. 85.4% of those with QPR's greater than 3.64 held this view.

h. 43.4% felt similarly about their willingness to disagree constructively with seniors, and 57.5% about their ability to do so.

i. 45.9% felt similarly about their overall ability to improve organizational effectiveness by using knowledge gained in academic studies.

j. 13.0% felt that the academic counseling received at NPS had a positive influence on them, and 11.9% a negative influence. There were significant variations dependent on curriculum.

k. 6.0% felt that the career counseling received at NPS had a positive influence on them, and 14.4% a negative influence. Again, there were significant variations dependent on curriculum.

l. 42.9% were in agreement with the proposition that NPS should offer a full range of systems technology courses (such as ASW). 24.2% were in disagreement. However, only 14.6% would prefer such a curriculum over the one they were currently pursuing, and 60.4% preferred their current curriculum.

m. 20.3% agreed with the proposition that they would probably not have made the Navy a career if they had not been selected for NPS. 61.8% were in disagreement. There were significant curricular-dependent variations in response.

n. 22.9% felt that their curricular office was beneficial to them as a student, and 32.7% held the opposite view. There were significant curricular-dependent variations.

o. 18.2% felt that their curricular office was beneficial to them as an officer, and 34.9% held the opposite view. Again, there were significant curricular-dependent variations.

p. 25.4% agreed with the proposition that, if it became necessary, they would be willing to forego one quarter of VA education benefits for each quarter at NPS. 50.8% were in disagreement. Students with low QPR's were most negative. 65.3% had some plans to use their VA benefits.

q. 11.9% agreed with the proposition that NPS had convinced them to become a restricted line officer. 60.4% expressed disagreement. The attitudes varied substantially with curriculum. 18.7% agreed with the proposition that the Navy needs a higher percentage of restricted line officers.

r. 53.6% agreed with the proposition that they would be better able to satisfy their personal and professional educational needs if their curriculum had more electives. 16.4% held the opposite view. There were significant curricular-dependent variations.

s. 19.3% agreed with the proposition that, when accepting orders to NPS, they planned to switch to another curriculum on arrival at Monterey. The only significant exception was among Management (Curriculum 817) students, only about 10% of whom had such plans. 61.8% disagreed with the proposition.

t. 54.2% affirmed plans to continue their studies after graduation, whereas only 11.8% expressed the opposite intent.

u. The range of student opinion was that 10 - 30% of officers above the grade of LTJG should pursue graduate education in engineering, 10 - 50% in management, 10 - 20% in science, 10% in government, 10% - 20% in systems technology, and that 10% should not pursue graduate education.

v. 57.6% of the students felt that 10% of their curriculum could be dropped without hurting their service or the academic program. 22.6% felt that 20% could be dropped.

4. Officers Selected for a Technical Curriculum at NPS

A survey was completed in December 1972 of officers selected for, (but not yet ordered to) technical curricula at NPS. The sample used was a population of 1947 officers selected by the 1973 board as primary or alternate candidates for postgraduate education in technically related fields. This figure excluded those chosen for operations research, systems acquisition, and computer systems management programs, as well as the more obscure technical areas.

Of the 1947 selectees, only 1755 had mailing addresses available on the Standard Navy Distribution List. A total of 1242 questionnaires were returned and have been analyzed. The analysis was carried out in terms of six overlapping subsets of the population:

(100%)	the total population
(48.5%)	officers selected for a specified curriculum (denoted "without XXX")
(51.5%)	officers not selected for a specific curriculum (denoted "XXX")
(31.9%)	officers with a technical baccalaureate degree
(43%)	aviation officers
(48%)	surface and submarine officers

Information of general interest follows:

a. 62% of the respondents were on sea duty or at operational billets.

b. The overall sample rank breakdown was: 10% LTJG, 75% LT, 15% LCDR, with a few commanders and warrant officers.

c. The overall sample indicated that the average officer answering the questionnaire was a 28 year old LT with over six years of service.

d. It was found that officers of age 26 and older, with more than four years of service, would be more likely to accept orders to NPS in a technical curriculum.

e. Most of the reserve officers were selected for the XXX category.

f. Officers with specialty designators (those outside the 11XX and 13XX categories) were usually ordered to a specific curriculum.

g. Officers with a 1120 designator were selected for specific curriculum, but very few ever receive orders to NPS.

h. 54% of the people selected for the XXX category would find a technical curriculum difficult, but 77% of the XXX category agreed that they would do well enough to graduate.

i. Comparison of the percentages in (h) to two other groups (those officers selected for a specific curriculum and those officers with a strong engineering background), disclosed a rather large discrepancy. Only 36.7% and 33.1% of these two groups respectively would find the course difficult. In reply to the question, "would they do well enough to graduate?" well over 90% of the officers in both groups replied that they felt that they would do well enough to graduate.

j. The data disclosed that the primary consideration of every group in accepting orders to NPS would be the curriculum they were offered.

k. Every group analyzed also indicated that a management curriculum was their first choice for an advanced degree.

Responses to certain of the specific questions follow:

a. Are you actively seeking orders to the Naval Postgraduate School at this time?

	OVERALL	WITHOUT XXX	XXX	ENGINEERING BACKGROUND	13XX	11XX
NO	691	270	421	203	288	335
YES	536	322	214	183	241	254

b. Do you feel the Navy needs more technically trained officers at this time?

NO	216	75	141	63	113	79
YES	985	512	473	321	395	502

c. Are you interested in postgraduate work?

Very interested and intend to follow through	820	446	374	270	331	409
Very interested	208	92	116	66	107	86
Fairly interested	128	37	91	38	67	54
Slightly interested	57	17	40	17	26	26
Not interested at all	26	8	18	5	7	16

d. Would you be interested in attending a postgraduate school selected by the Navy?

	OVERALL	WITHOUT XXX	XXX	ENGINEERING BACKGROUND	13XX	11XX
Very interested and intend to follow through	447	277	170	151	182	220
Very interested	302	165	137	101	145	127
Fairly interested	213	74	139	59	95	105
Slightly interested	121	45	76	45	57	92
Not interested at all	147	33	114	35	55	83

e. Would you be interested in orders to the Naval Postgraduate School at this time in a management field?

Very interested and intend to follow through	300	139	161	75	148	134
Very interested	265	135	130	93	117	126
Fairly interested	261	140	121	87	118	130
Slightly interested	160	86	74	67	61	78
Not interested at all	239	91	148	69	87	130

f. Would you be interested in orders to the Naval Postgraduate School at this time in a technical field?

Very interested and intend to follow through	272	191	81	114	103	143
Very interested	265	166	99	95	132	109
Fairly interested	196	79	117	60	34	96
Slightly interested	185	74	111	53	86	83
Not interested at all	314	87	227	71	129	158

g. Would you be interested in orders to the Naval Postgraduate School at this time in a combined management and technical curriculum, i.e., a hybrid curriculum in which you would receive a dual master's degree, for example in both electrical engineering and management?

	OVERALL	WITHOUT ENGINEERING BACKGROUND		WITH ENGINEERING BACKGROUND		
		XXX	XXX		13XX	11XX
Very interested and intend to follow through	271	176	95	109	110	137
Very interested	295	173	122	117	131	140
Fairly interested	216	103	113	59	87	104
Slightly interested	170	62	108	50	89	69
Not interested at all	277	78	199	56	117	137

Respondents were asked to agree or disagree with the following statements, with percentage responses as shown:

h. "Lack of operational fitness reports in my career file for the period of instruction would hurt my career opportunities."

Agree: 18% Disagree: 64%

i. "The additional obligation incurred would decrease flexibility in my personal career plans."

Agree: 29% Disagree: 56%

j. "Another operational billet would enhance my career more at this time than attending the Naval Postgraduate School."

Agree: 36% Disagree 46%

k. "My opportunity for promotion would be increased by attending the Naval Postgraduate School in a technical curriculum."

Agree: 56% Disagree: 19%

l. "My retirement plans would benefit from a master's degree in a technical area."

Agree: 60% Disagree: 16%

m. "I feel that a master's degree in a technical field would put me into a desirable (P-coded) subspecialty."

Agree: 40% Disagree: 14%

n. "If I failed to do well enough academically to obtain a master's degree in a technical field from the Naval Postgraduate School, I feel I would suffer personally and professionally."

Agree: 71% Disagree: 15%

Appendix D

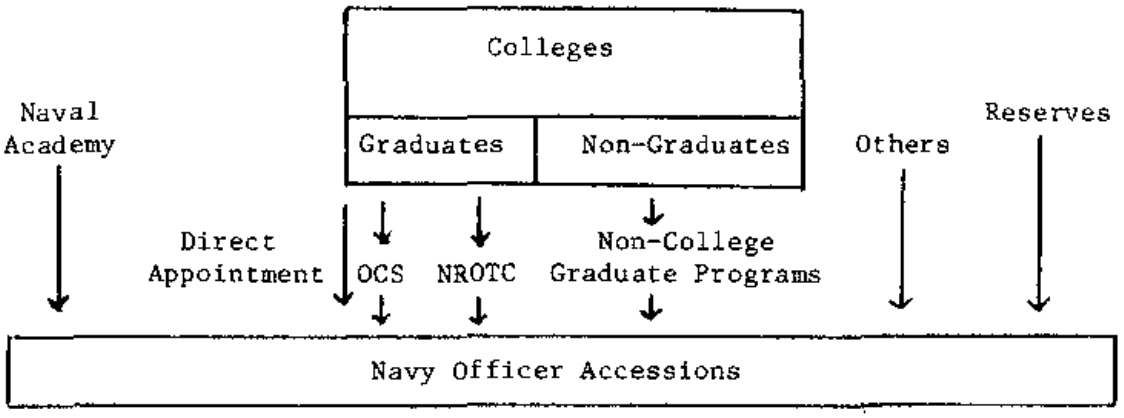
MOTIVATION OF OFFICERS AND GRADUATE EDUCATION OF OFFICERS

A discussion of the integration of education with other personnel functions from the individual officer's point of view is facilitated if the considerations are organized into two major parts. Therefore, in the first part of this paper, after a general introduction has been laid, the role education plays in the accession of new Naval officers will be discussed. The second major part of the discussion will focus on the role education plays for "on-board" Naval officers.

The Relationship of Education and the Procurement of Naval Officers

The usual sources of regular Naval officers are shown in Figure I.

Figure I



(Source: Gates Commission's Report on an All-Volunteer Armed Force, 1970)

The direct appointments include physicians, dentists, and veterinarians. The category labeled others includes primarily lawyers and medical specialists, but it also includes women officers and nurses and those officers commissioned directly from the enlisted ranks.

The percentages of the Navy officer accessions for the different sources and for three fiscal years are shown in the following table.

Table I

Navy Officer Accessions (%)

	FY60	FY65	FY68
1. Academy	6.9	6.5	6.0
2. ROTC & Other College Programs	23.0	16.9	15.3
3. OCS	30.5	35.3	48.8
4. Non-college Graduate Programs	5.6	3.3	.5
5. Direct Appointment	11.1	8.8	16.0
6. Ad. from Reserves	1.2	4.7	6.5
7. All Others	21.8	24.2	7.0
TOTALS	100.0	100.0	100.0

(Source: Gates Commission's Report, p. 71)

The data in Table I make it clear that the Nation's universities and colleges play a very major role in the Navy's system of officer procurement. It is also appropriate to examine some of the motivations of officers coming into the Navy; hence, the following table presents some additional data about the procurement of Naval officers and the percentage of those individuals who were draft motivated to join the Navy.

Table II

U. S. Navy Officer Procurement

	Fiscal Year			
	1970	1971	1972	1973
Line & Staff (except medical)				
Goal	11,623	7,825	9,241	7,539
Attained	11,623	7,825	6,380[1]	---
Medical Officers				
Goal	1,428	1,175	1,634	1,340
Attained	1,428	1,175	1,180[2]	---
Motivation (%)				
Draft Motivated	40[3]	38[4]	---	---
True Volunteers	60[3]	62[4]	---	---

1. Through January 1972.
2. Through December 1971.
3. Based on personnel surveys.
4. Based on draft lottery data.

(Source: Congressional Hearings, March 10 & 13, 1972)

The data in Table II, particularly the percentage of draft motivated officer volunteers, lead one to the conclusion that, in a no-draft environment, the Navy may have to increase its recruiting efforts at the Nation's colleges. (Unless, that is, the Navy dramatically reduces its number of junior officers, and/or the Navy increases its procurement of officers from other sources such as the Naval Academy or from the enlisted ranks.)

The question of the percentage of youths who can be considered draft motivated (to join the Navy) will be addressed again in later portions of this paper.

In understanding the role education plays in the procurement of Naval officers, it is worthwhile to step back for a moment to consider the typical high school graduate as he or she stands on the threshold of the labor market and begins to make choices among possible careers. This choice process is of extreme importance to the individual as, "There is increasingly, for many occupations, only one route in - that taken when young. Failing to take that route bars one forever from the possibilities of that occupation." (From a 23 March 1967 speech by Mr. S. M. Miller of the Ford Foundation.)

Career Choice

According to the U. S. Employment Services, Dictionary of Occupational Titles, Americans are employed in around 30,000 different jobs. This is not to say, however, that the typical entrant to the labor market will find all of these positions open to him or her. Some jobs, such as Admiral, are not often gained without considerable appropriate experience. Other jobs are not available because they require prior education the individual doesn't have, or because he is faced with unfavorable supply and demand factors in the labor market. Still other jobs aren't considered by an entrant to the labor market because they don't match his/her vocational interests or aptitudes. Lastly, some jobs aren't considered because the individual considers them as being too low in status or prestige. Nevertheless, most individuals entering the labor market face a broad range of jobs and occupations from which they have to make a choice.

People are also called upon to make choices among organizations in which to pursue their occupations. In the civilian sector the occupation is usually chosen before the decision about which organization to join is made, while in joining a military organization the relationship between these choices is not generally so clear. People may join the Navy before deciding what (subspecialty) role they wish to play in it.

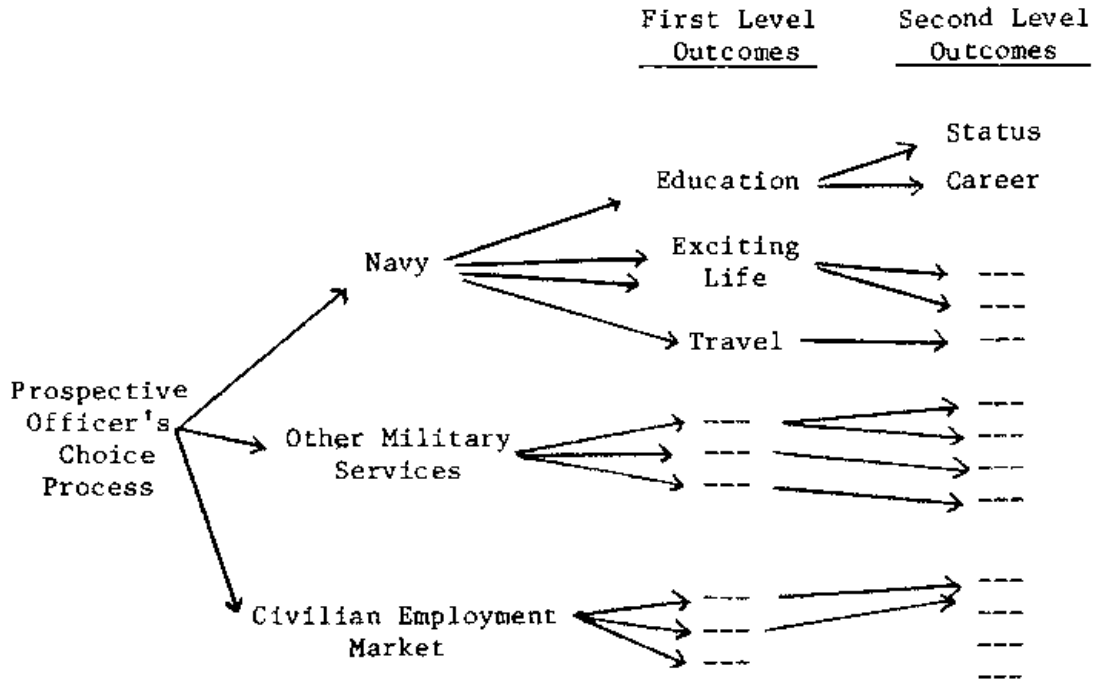
In studying such a choice process, it is possible to take two different approaches. A normative approach is concerned with how the choice should be made, while an empirical approach focuses on explaining how choices are made. Vocational guidance, with its testing and interviewing, focuses on the normative approach, while the empirical approach concentrates on the variables influencing vocational decisions. Both of these approaches to the study of occupational and organizational choice will be used in this paper.

In approaching an empirical explanation of occupational and organizational choice, it is useful to propose a simple cognitive model of choice. It is proposed that a preference for an occupation (or organizational role) for a person will be at its highest if the occupation is viewed as a <u>means</u> of achieving (with certainty) goals that the individual values most highly, or it allows him/her to avoid (with certainty) outcomes that he or she most abhors. Contrarily, the preference for an occupation will be lowest when being in the occupation is viewed as blocking (with certainty) the attainment of the individual's most highly prized goals, or viewed as providing with certainty the outcomes he most abhors.

This type of model of motivation can be represented quite readily by a simple tree diagram. If one believes that the future holds a "prospective officer's employment market", versus a buyer's ("Navy market") the diagram is best drawn as shown in Figure II. If one believes, however, that the future employment market will be one favoring the buyer of human services, the suggested temporal relationship between Navy → education should probably be reversed.

Figure II

A Schematic Model of the Occupational Choice Process in a "Prospective Officer's Employment Market"



The outcomes in Figure II can be thought of as each having some cognized value for any particular prospective officer. Additionally, the prospective officer can be thought of as having beliefs about the

relationships between joining, say, the Navy and obtaining first-level outcomes and as also having beliefs about how instrumental different first-level outcomes are for gaining associated second-level outcomes. A motivational model, such as presented in Figure II, leads to the prediction that, given the opportunity, an individual will choose an occupation (or organization) when the expected outcomes from that occupation are higher than those he expects to otherwise attain.

Having laid this general foundation about choice-making, it is appropriate to look at the outcome (and occupational) preferences of college age young people in order to understand better the occupational and educational choices of prospective Naval officers.

Educational Opportunities and Preferences

Today's young person finds himself (or herself) in a world where the enrollments in four-year colleges are slowing and plateauing in growth, but the enrollments in junior colleges are booming. As a matter of fact, many of the nation's 2,500 colleges already have space for additional students. Tables III and IV, below, present some trends in college enrollment that are important to note.

Table III

The Boom in Junior Colleges (Two-Year Colleges)

	1960	1970	1980
Number of Students Enrolled	451,000	1,630,000	3,001,000 (est.)
Admissions to Two-Year Colleges as Share of Freshman Admissions to All Colleges	23%	38%	42% (est.)

(Source: U. S. News & World Report, 6 March 1972)

Table IV

High School Graduates and College Enrollments (In Thousands)

Year	High School Graduates	College Enrollment	
		First Time	Total Full-Time Equiv.
1968	2702	1630	5810
	Estimated		
1970	2969	1836	6303
1975	3459	2300	8197
1980	3743[1]	2582[2]	9539[2]
1985	3263	2284	9228
1990	3351	2346	8674

1. Peak is predicted to be in 1979.

2. Peaks are predicted to be in 1982.

(Source: A. M. Cartter, "Scientific Manpower for 1970 - 1985," Science, 9 April 1971.)

The data in Tables III and IV clearly indicate that an increasing percentage of college freshmen will be found at junior colleges and that college enrollment in general will peak within the next 10 years. Naval officer procurement programs will have to adjust to deal with the movement of freshmen and sophomore students to junior colleges and away from senior institutions. According to U. S. News and World Report , some of the primary reasons for the growth in junior and senior colleges include:

1. Many parents and students are finding they cannot afford colleges at today's prices.
2. "A questioning of the true value of a liberal arts education that does not train youths for jobs."
3. "A relaxation of draft pressures...."

Junior colleges are undoubtedly allowing a broader spectrum of people to attend college, but college graduation is still quite related to family socio-economic status as shown by the data in Table V.

Table V

Distribution of College Graduates Classified by by their Father's Occupation

	Distribution of 1,000 Children	% of Children From Each Occup. Level Graduating	No. of Children From Each Occup. Level Graduating per 1,000 Pop.
Professional and Semiprofessional	65	43%	28
Managerial	128	19	24
Sales, Clerical, Service	158	15	24
Farm	162	6	10
Skilled and Unskilled Labor	487	8	39
TOTAL	1000		

(Source: Tyler, The Psychology of Human Differences (2nd ed.), p. 349)

As the figures in Table V show, 43% of the children of professional men graduate from college, as compared with only 8% of the children of skilled and unskilled laborers; out of every 1000 children, 39 from laboring class families graduate from college as compared with 28 from professional families. Further, a study of high school graduates showed that students scoring very high (in top 10%) on college aptitude tests are quite likely to get to college regardless of family background.

However, students scoring between the 70th and 90th percentile on these entrance tests were not likely to attend college unless they came from an upper class family. (Source: Tyler, The Psychology of Human Differences (2nd ed.), p. 350.)

To summarize, the data presented above indicate that Navy officer procurement policies should find a way to capitalize on the increasing enrollments in two-year colleges and on the large number of young people who are capable of doing adequate senior level college work, but who cannot, apparently, afford it financially. (It is estimated that as many as 50% of U. S. college students require financial aid.) By offering, to those individuals who have sufficient academic aptitude, Navy supported education as an incentive, the Navy should be able to recruit many officers (assuming these young people desire the education offered). For those individuals who have completed a junior college program, the Navy would only have to fund, usually, the additional two years for the individual to attain the bachelor degree and, perhaps, three years, in the same field, for a M.S. or M.A. degree.

It is now reasonable to turn to the question of what kinds of curricula and programs will be preferred (and act as highly valued outcomes using the terminology of Figure II) by the individuals the Navy will be attempting to recruit.

Student background characteristics have been found to be related to their curriculum preferences. Students from high socioeconomic backgrounds overchoose, in proportionate terms, fields related to medicine, social science, arts and humanities, law, and political science and government. Students from lower socioeconomic backgrounds overchoose

the fields of education and engineering (and related technical fields). Fields such as physics, biology, and mathematics are chosen more equally by students of various status backgrounds.

Choice of major field is also associated with the sex of the student. Males overchoose engineering, physical science, prelaw, medicine, and business fields. Women are more likely than men to enter education, humanities and fine arts, social science, and biology.

Additionally, choice of major field seems to be related to the individual's race. Negro students are more likely than white students to choose biological science, social science, and general education. Black students are less likely than whites to choose physical science, engineering, prelaw, business, and humanities. (Source for data on student background and curriculum choice is: The Impact of College on Students, by K. Feldman and T. Newcomb, Jossey-Bass, 1970.)

It is also important to note that longitudinal studies conducted at a number of colleges have found that between one-third and two-thirds of the students changed their choice of career or their choice of major field during their college years. The curricular or vocational fields that usually make the biggest net gains are education, business, social science/social service. Engineering, physical science, and medicine and dentistry usually show net losses. Studies of the net losses in enrollment in these fields show they are not because of a particularly high rate of exodus of students from them (as compared with other fields), but because of a relatively low recruitment into them during college years as compared to the gains other fields experience. (Source: The Impact of College on Students, p. 38.)

Curricular preferences are also undoubtedly driven by the individual's beliefs about the employment market he will be entering. Enrollment in engineering and physical science fields have recently been changing due, in part, to employment market conditions. Tables VI-IX present some of the enrollment trends of import to the Navy. (Source: F. E. Terman, "Supply of Scientific & Engineering Manpower: Surplus or Shortage?" Science, 30 July 1971, pp. 399-405.) The data in Tables VI-IX indicate that the degrees (in terms of number of degrees granted) in engineering and science are predicted to peak around 1982, while the degrees in these fields (as a percent of all baccalaureate degrees) have been decreasing in recent years. Table IX shows that the percentage of baccalaureates earned by women has been increasing in the engineering, mathematical and physical sciences in the aggregate, but this gain is apparently due to an increased percentage of women in the mathematical sciences, as the percentages of women receiving baccalaureate degrees in engineering and physical sciences have held level and declined, respectively.

The educational implications for the Navy of the patterns sketched above depend mightily upon several factors:

1. The Navy's need for engineering, and mathematical and physical sciences.
2. The Navy's policies concerning the roles of women in the Navy.
3. The Navy's policies concerning the roles of blacks in the Navy.

The data in Table VII, for instance, show a decreasing percentage of baccalaureate degrees being granted in physical science and engineering,

and Table VIII shows that the number of baccalaureates being granted in engineering and science is projected to decline after about 1982. Certain sets of skills may, therefore, become harder to procure. Another implication is that engineering and science curricula will probably less often be useful as a positive incentive in the officer procurement process. (The vagaries of the civilian employment market could well counter this, however. If a shortage of engineers and physical scientists becomes visible, the incentive values of such curricula would likely increase.)

There have been a number of studies concerned with the future employment market for college graduates. Several of these studies are abstracted below for this paper. (Source: Science, 27 August 1971, pp. 790-791.)

1. Brode's study.

   Conclusions: "There will be an annual surplus of scientists and engineers until 1986, and a deficit from 1986 to 2005. The 1968-1986 surplus will about equal the 1987-2005 deficit." (B.S. or graduate degree holders.)

2. Bureau of Labor Statistics study.

   Conclusions: "The supply in 1980 is projected to be significantly below requirements for chemists, counselors, dietitians, dentists, physicians, and physicists; in reasonably good balance for engineers, geologists and geophysicists, optometrists, architects, lawyers, and pharmacists; and significantly above requirements for mathematicians, life scientists, and schoolteachers." (Baccalaureate or advanced degree holders.)

3. Cartter's study.

   Conclusions: "Even if all junior colleges were converted to 4-year colleges, every high school graduate went to

college, and every new college teacher hired in future possessed a Ph.D., by 1980, a smaller percentage of doctoral degree recipients would be likely to find academic positions than has been true for the preceding 25 years."

4. National Science Foundation's study.

   Conclusions: (All of the conclusions are about doctorates.) "In the physical sciences, life sciences, and mathematics, supply and requirements will be in approximate balance in 1980. In engineering and in social sciences the projected supply in 1980 will significantly exceed the projected utilization. The percentage employed in positions other than research and development or on university faculties will be substantially larger than at present."

Although the predictions of the four studies listed above are not in total accord with one another, all of them indicate a "buyer's" (Navy) market for some degree levels and areas, the specific areas being dependent upon the year of concern.

If the Navy wishes to recruit additional women officers, and to use education as a recruitment incentive in the process, it will have to realize that the pattern of female academic field choices is, at present, quite different from that of males. Likewise, the Navy will still find the recruiting of women who already have a baccalaureate degree, or more, in engineering to be difficult if a significant number of such female degree holders is sought. For the immediate future, one can expect that this will be a seller's employment market for women in general, and for women holding degrees in historically "masculine fields," in particular. Thus, the Navy will face a female employment market in which it will have a tough time recruiting, unless it wishes to recruit teachers, of which there is no dearth.

Many of the same statements made concerning the recruitment of women officers can be made about recruiting black officers. As mentioned earlier, black students are more likely than whites to choose biological and social science, and general education curricula, and to be less likely (than whites) to choose physical science, engineering, prelaw, business, and the humanities. The employment market for blacks with college degrees is also one which is best considered a seller's market.

Attributes of Jobs and Careers Important to College Students

Studies of the characteristics of importance to students in picking a job or career have been conducted at many of the Nation's colleges and universities. (Using the terminology of Figure II, these characteristics or attributes are first- and second-level outcomes cognized as following from occupational membership.) As these studies are numerous, only general trends and patterns will be presented.

A frequent finding in the studies of college students' preferences for job and career attributes is that there are some changes in these preferences between the freshmen and senior years. The general trend of student change (from freshmen year to senior year) is, "...toward those of 'general education' and 'appreciation of ideas' and away from such instrumental goals as narrow preparation for a vocation." "... while opportunity to use one's own special abilities is considered very important by both freshmen and seniors, the latter show increased preferences for jobs that invite the use of one's own creative abilities. Thus seniors, as compared with freshmen, tend to demand more than 'a good fit'; they also want opportunities for self-expression. Furthermore,

seniors appear less concerned than freshmen about job security. The change is toward the valuing of intrinsic rather than extrinsic rewards from work." (Source: The Impact of College on Students, Feldman and Newcomb, p. 19.)

A major implication of these studies, then, is that seniors (more than freshmen) tend to desire work that is satisfying as an end in itself and the rewards of a job are intrinsic to the job itself, rather than viewing work as an instrumental means for achieving extrinsic rewards such as earning a good deal of money. Tables X and XI present the results of two of the many studies of college students' job and career attribute preferences.

Table X

Percent of students responding that each of the following requirements of an ideal job is "highly important."*

	Fr	Sr
Provide me an opportunity to use my special abilities or aptitudes.	88.1% (1)	86.4% (1)
Give me an opportunity to be helpful to others.	66.8% (2)	55.0% (5)
Enable me to look forward to a stable, secure future.	63.3% (3)	44.0% (6)
Give me an opportunity to work with people rather than things.	58.0% (4)	57.5% (4)
Permit me to be original and creative.	52.4% (5)	59.5% (3)
Leave me relatively free of supervision by others.	49.7% (6)	62.5% (2)
Give me a chance to exercise leadership.	41.1% (7)	43.5% (7)
Provide me with a chance to earn a great deal of money.	39.4% (8)	30.7% (8)
Provide me with adventure.	29.4% (9)	30.2% (9)
Give me social status and prestige.	25.2% (10)	21.3% (10)

*Sampling of males at Northwestern University Longitudinal study of 1961 and 1962 classes graduating in 1964 and 1965, respectively.

(Source: The Impact of College on Students, Vol. II, p. 17.)

Table XI

Percent of students responding that each of the following requirements of an ideal job or career is "highly important."*

	Fr.	Sr.
Provide an opportunity to use my special abilities or aptitudes.	75% (1)	79% (1)
Enable me to look forward to a stable, secure future.	69% (2)	53% (2.5)
Enable me to be creative and original.	43% (3)	53% (2.5)
Give me social status and prestige.	23% (4)	27% (5)
Provide me a chance to earn a good deal of money.	41% (4)	37% (4)

*Samplings of males at eleven schools, Dartmouth, Harvard, Cornell, U. of Michigan, UCLA, U. of Texas, Wayne State, Fisk, U. of No. Carolina, Yale; Westeyan.

(Source: The Impact of College on Students, Vol. II, p. 16.)

There are several implications that can be drawn from the preferences of college students shown in the preceding paragraphs. First, the career outcomes to stress when recruiting college freshmen are somewhat different than the pattern of outcomes to stress when recruiting college seniors. Second, college graduates must view certain kinds of outcomes as following from being in the Navy, if the Navy wants to increase its success (ceteris paribus) in procuring college graduates. Similarly, after funding an individual's education, the Navy should provide offering intrinsic rewards to aid in retaining that officer. (Retention factors will be addressed in a later part of this paper.)

Attitudes Toward the Military

The next data to be reviewed here address how college age youths view the military in general and the separate services such as the Navy.

Included in these data are some hints as to how these individuals view the likelihood of obtaining various outcomes (positively and negatively valued) as a consequence of being in the Navy and the other services.

In November 1971, the Human Resources Research Organization (HumRRO) conducted a survey of 1,960 U. S. males in the 16 to 21 years old age group in order to determine their attitudes about the military. One of the more important findings of this survey was that only 40% of the males surveyed would not have any personal considerations deterring them from entering a military service voluntarily. (Source: HumRRO, Attitudes of Youth Toward Military Service: A Comparison of Results of National Surveys Conducted in May and November 1971, HumRRO, Alexandria, VA, 1972, p. 23.)

The 60% of the 1,960 males in the survey who said they had personal considerations against (In the terminology of Figure II, these are outcomes viewed as being related to being in the military.) volunteering for the military were asked to pick a single statement best describing their reasons for not joining a military service. A tabulation of these "most descriptive reason" responses are given in Table XII.

Table XII

Responses to HumRRO Survey on Attitudes Toward Military Service

Reasons for Not Voluntarily Enlisting	Percent
I don't believe in war or in a military establishment.	30
I wouldn't want to relinquish my freedom to do as I please.	23
In the military, I could not live the style of life I want for myself.	23
I would be afraid of getting injured or killed.	16
All other reasons.	8
	100

The HumRRO survey also asked the respondents to determine which one service was best described by each of a number of statements. These data are given in Table XIII.

Table XIII

Responses to HumRRO Survey on Attitudes Toward Military Service

Numbers in table indicate the percent of the respondents choosing the one service best described by each statement

Statement	Army	Navy	Air Force	USMC	Coast Guard	No Diff.
Best Pay	9	10	34	8	3	36
Best chance to prove oneself a man	10	4	8	55	1	23
Best living conditions for families of servicemen	9	16	40	3	9	24
Best chance to get ahead in a career	11	16	44	3	3	22
Best chance to learn new and useful skills	12	17	39	4	3	25
Best chance to use one's skills and abilities	13	16	32	7	2	30
Most opportunity for travel in foreign countries	14	48	18	4	1	14
Most attractive uniform	4	20	17	30	3	26
Most exciting life	6	24	25	13	3	29

The data in Table XIII appear to indicate that the Navy suffers from an "image problem", at least when compared to the Air Force. Of particular relevance for this paper are the low percentages of respondents choosing the Navy in conjunction with the items on getting ahead in a career, and learning and using one's skills and abilities. The reader may recall at this point that college seniors strongly desire (see Tables X and XI) jobs and careers utilizing their skills and abilities.

Another portion of the HumRRO survey was concerned with the extent to which the respondents attributed important enlistment incentives to the various military services. Each respondent was asked which of the following outcomes (more than one could be chosen by each respondent) would encourage him to enlist and which service provided the best of these inducements. These data are given in Table XIV. (A caveat: this survey was conducted of youths and not just "enlisted material" or "officer material". The questions in the survey are framed around enlisted status, however. Hence, the response percentages are, probably, different from those that would be obtained if the questions had been pointed more toward officer procurement.)

Table XIV

Responses to HumRRO Survey on Attitudes Toward Military Service

Enlistment Inducements by Services

Inducements (Outcomes)	Percent Choosing Service as Best Providing Each Inducement						
	Overall Rate*	Army	Navy	USAF	USMC	Coast Guard	No Diff.
Opportunity for travel	56	9	58	22	2	2	8
Paid college tuition	51	17	14	22	4	2	41
Skills training	39	15	19	44	6	2	13
Enrollment in an officer's training program	21	25	18	29	7	2	20
Choice of assignment	41	20	22	28	4	4	23
Pay	23	12	16	34	5	2	31

*Overall rate of preference for that inducement.

Of particular importance to this study are the popularities of paid college and choice of assignment, as shown in Table XIV. The Navy's "image" could use improvement in conjunction with both of the aforementioned

incentives if it wishes to use them in procuring new men. The importance of career opportunities in volunteers' decisions to join the Navy was also found in a 1969 survey conducted for the Navy. (Source: Motivational Factors in Accession and Retention Behavior, Center for Naval Analyses, Institute of Naval Studies, Arlington, VA.)

A Normative Approach to Career Choice

As was asserted earlier in this paper, it is possible to take either an empirical or a normative approach when studying the career choice process. Most of the preceding data presentations and discussions have utilized the empirical approach to the choice process. The next section will discuss career interests and aptitudes and will focus on the relationships these variables have to how career choices might be best made.

Vocational Interests

Much of what is known about vocational interests comes from work done using the Strong Vocational Interest Blank (SVIB). Developed prior to 1927, and put into use in 1927, the SVIB has been given to many hundreds of thousands of individuals. It is useful to discuss the scoring scheme--a highly empirical one--used in developing the SVIB. Hundreds of items were gathered dealing with occupations, school subjects, recreational activities, and so on. A scoring key for an occupation was constructed by tabulating the responses of a group of men who had been identified as successful and satisfied members of that occupation and comparing the percentage of this group endorsing each response to an item with the percentage of endorsement garnered from a men-in-general

sample. (The men-in-general sample consists of men from a great many occupations.) Any response for which the difference in percentage was statistically significant became a part of the scoring key for that particular occupation. Scoring scales are now available for over 50 occupations for males taking the SVIB, while the women's version of the SVIB can be scored for about 30 occupations.

An individual who has taken the SVIB receives scores telling him, for each occupation, if his preferences and attitudes are "unquestionably" like those of people in that occupation, or if he has some attitudes and preferences in common with that occupation, or if he has preferences and attitudes showing little or no resemblance to persons in that occupation.

"One of the most striking things that extensive research has shown is that the patterns of likes and dislikes identifying a person as a member of a certain occupational group are very stable aspects of his personality." (Source: Leona Tyler, The Psychology of Human Differences (2nd ed.), p. 188.) Table XV shows some data on the stability of scores received on the SVIB's occupational scales.

Table XV

Stability of Scores on the Strong Vocational Interest Blank (SVIB)

No. of Students	College Level	Data (Years) Tested	Age at First Level	Median Correlation
50	Fr	1930-31	19	.88
50	Sr	1927-32	22	.84
50	Sr	1932-37	27	.86
50	Fr	1931-39	20	.72
50	Fr	1930-39	19	.67
50	Sr	1927-37	22	.82
50	Fr	1939-49	28	.87
50	Sr	1937-49	32	.88
50	Sr	1939-49	27	.84
50	Bus. Grads.	1931-49	23	.74
50	Fr	1931-49	20	.72
50	Fr	1930-49	19	.72
228	Sr	1927-49	22	.76
198	Graduates	1927-49	25	.72

(Source: Tyler, Psychology of Human Differences (2nd ed.), p.190.)

The magnitude of the correlations seems to depend upon both the length of the interval between the testings and the subject's age when he took the first test. The high correlations in Table XV attest to the stability of vocational interest patterns as measured by the SVIB.

By analyzing the intercorrelations among the scores on the different occupational scales, occupational clusters may be formed. If the scales that correlate more than .60 with one another are grouped, the occupational families shown in Table XVI are found.

Table XVI

Occupational Families Based on XVIB Scale Intercorrelations

Group	Occupations in the Group
I	Artist, psychologist, architect, physician, psychiatrist, osteopath, dentist, veterinarian (Human Science)
II	Physicist, chemist, mathematician, engineer (Physical Science)
III	Production manager
IV	Farmer, carpenter, printer, math-science teacher, policeman, forest service, army officer, air force officer (Technical and Nonprofessional)
V	YMCA director, personnel manager, public administrator, vocational counselor, YMCA secretary, social science teacher, city school superintendent, minister, social worker, physical therapist (Social Welfare)
VI	Musician (performer), music teacher
VII	CPA owner
VIII	Senior CPA, accountant, office man, purchasing agent, banker, mortician, pharmacist (Business Detail)
IX	Sales manager, real estate salesman, life insurance salesman (Business Contact)
X	Advertising man, lawyer, author-journalist (Verbal)
XI	President, manufacturing concern

"Groups" III, VII, and XI each consist of only one occupation. In using the SVIB for vocational counseling, emphasis falls on seven

occupational groupings: Human Science, Physical Science, Technical and Nonprofessional, Social Welfare, Business Detail, Business Contact, and Verbal. It is important to note that the Army and Air Force occupational scales fall into Group IV and therefore are quite statistically independent of scores on the occupational scales such as for engineer, personnel manager, and public administrator. In other words, knowing a man has the interests of a military officer does not reduce your uncertainty about many of his other career interests. (Unless he's been through a certain sort of selection process beforehand.) Therefore, if a military officer is also supposed, by the Navy, to be an engineer, he should score high on both of these occupational scales on the SVIB. The importance of interests has been impressively shown by the validation of the following four propositions by 20 to 30 year longitudinal studies:

1. Men continuing in occupation A obtain a higher interest score in A than in any other occupation.
2. Men continuing in occupation A obtain a higher interest score in it than do men entering other occupations.
3. Men continuing in occupation A obtain higher scores in A than do men who change from A to another occupation.
4. Men changing from occupation A to occupation B score higher in B prior to the change than in any other occupation, including A.

The SVIB has already been shown to be useful as a predictor of the career motivation of NROTC students, (Source: N. Abrahams and I. Neumann, The Assessment of Career Motivation Among NROTC Applicants with the SVIB, San Diego: Naval Personnel and Training Research Lab., October 1971.) and as a predictor of voluntary disenrollment from the Naval Academy. (Sources: Abraham, Neumann, and Dann. Use of the SVIB in Identifying

Naval Academy Early Motivational Disenrollees, 1969, and, Neumann and Abrahams, A Revised SVIB Scale for Prediction of Early Voluntary Disenrollment from the Naval Academy, (Letter Report), 1970. Both reports from San Diego: Naval Personnel and Training Research Laboratory.) Additionally, the SVIB has been shown to be useful in predicting retention in the National Oceanic and Atmospheric Administration (NOAA) officer corps. (Source: Neumann and Abrahams, The SVIB as a Predictor of Retention in the NOAA Officer Corps, San Diego: Naval Personnel and Training Research Laboratory, 1972.)

Additionally, some work at the Naval Postgraduate School (NPS) has shown scores on the SVIB to be somewhat related to (predictive of) grade point averages and the pattern of scores on the standard SVIB occupational scales to be different for students from the different NPS curricula. If past experience is any guide, work directed at developing SVIB scales related to success and satisfaction in different curricula would be successful and would aid the Navy in identifying officers for different specialty and associated curricular areas.

Before terminating this discussion of vocational interests and the SVIB, the implications of the occupational families mentioned in Table XVI should be further explored. These occupational fields were defined using data made up of responses to activity preference and attitude items in the SVIB, and not from aptitude or ability data, so an occupational family does not, necessarily, contain occupations requiring the same patterns of aptitudes. These occupational families do, however, provide one with groupings of occupations within which an individual might be expected to want to move, and movements within an occupational family

can be expected to occur much more often than movements across occupational family boundaries.

The occupational families are of somewhat limited use in designing, say, a set of Navy occupational families because the SVIB was developed using predominantly civilian occupations. Analogous Navy occupational families might be developed, however, by means of an appropriate Navy interest research program. These occupational families would provide empirically based guidance for the development of officer subspecialty areas. If one harkens back to the data presented earlier on the preferences of college students and the survey of men interviewed in the research by HumRRO, the importance for the Navy of defining desired career patterns that utilize an individual's special abilities and skills cannot be overestimated. More data reflecting this same need will be presented when retention considerations are addressed later in this paper.

Interest scores, such as from the SVIB, are very useful when counseling individuals about career fields that they might pursue, but the individual's aptitudes must also be considered when career or curricular choices are to be made.

Academic Aptitudes

The data on academic and vocational aptitudes are voluminous. The United States Employment Service, for example, has a program for identifying the ability pattern(s) associated with successful performance in each of numerous occupations. In the nation's colleges and universities, the Graduate Record Examination (GRE), developed and published by the Educational Testing Service, is a very commonly used predictor of academic aptitude. It is suggested that this measure be studied for its applicability

in selecting officers for graduate study.

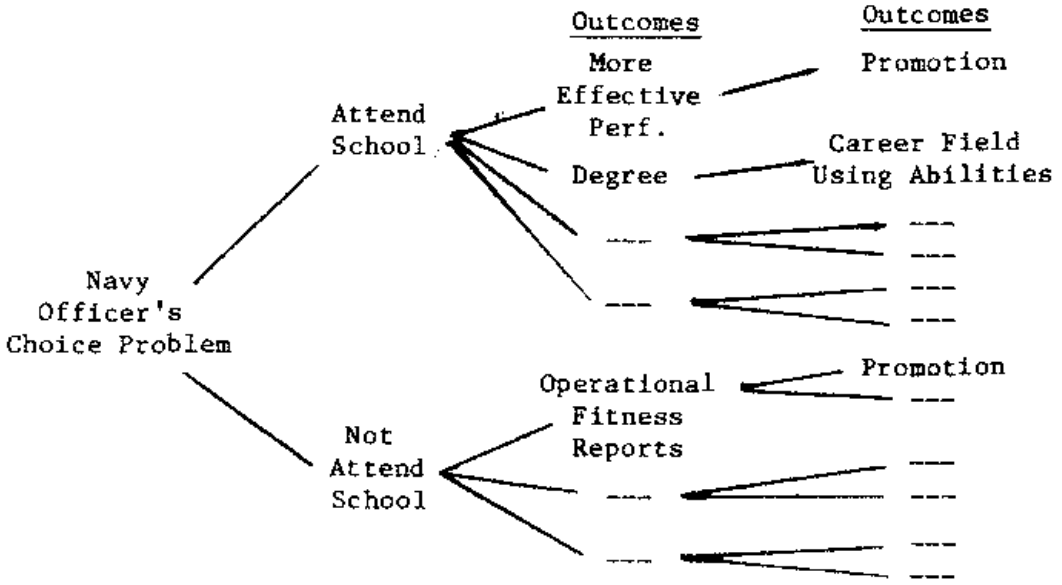
The Role of Education for "On-Board" Naval Officers

At the very beginning of this paper it was explained that the discussion would be divided into two major parts. The first section, which was presented above, discussed the role of education in the accession of new Naval officers. This, the second part of the discussion of the integration of education with other personnel functions from the individual officer's point of view, considers the role education plays for "on-board" Naval officers.

In order to facilitate a discussion of the relationship of education to other personnel functions from the individual's point of view, Figure IV is presented to portray schematically the choice situation the Navy officer faces when deciding whether or not to seek schooling. Figure IV also, of course, should provide Navy policymakers with clues as to how to motivate Navy officers toward seeking, or avoiding, additional education.

Figure IV

Schematic Model of Navy Officer's Educational Choice Circumstances



As was discussed in conjunction with Figure II, each officer is hypothesized to have values associated with each outcome and to have beliefs as to the probability relationships between outcomes, e.g., receiving degree and placement in jobs using abilities, and between actions and outcomes, e.g., attending school and receiving a degree. The remainder of this section of this paper will explore the data that are available about officers' views on their careers and education and will attempt to structure the discussion around the model given in Figure IV.

If there were no need in the Navy for the increased education of officers, this discussion would be quite simple. The educational needs of the Navy, however, might be nearer the opposite extreme. For instance, one estimate is that the minimum annual input of Navy officers to postgraduate programs for at least ten years must be fifty percent greater than the average annual input over the years 1965-1970. (Source: RADM R. W. McNitt, "The Naval Postgraduate School Sixty Years Young," U. S. Naval Institute Proceedings, June 1970.) This estimate takes on even increased importance when it is realized that technical curricula (engineering and physical science curricula) at the Naval Postgraduate School (NPS) have in recent years been experiencing enrollment shortfalls. (Only about 75% of the technical curricula quotas were filled in the period 1965-1970.)

In an effort to understand the decisions officers were making, such as attending NPS or not, several surveys have been conducted of NPS students, or of students selected for technical curricula at the NPS. The largest of these surveys was initiated in the fall of 1971, and the

model given in Figure IV was used in guiding the development of the survey. This survey was conducted by four NPS graduate students (C. S. Sharrocks, E. P. A. Wilson, C. C. Trotter, and S. L. McIntyre), and has come to be known as the "Sharrock's study".

The Sharrock's study had its birth in the fall of 1971 after a BUPERS committee met as an ad hoc committee to investigate, "how to alleviate shortages of technically educated officers in the Navy". Capt. O. A. Hahs (now retired) of NPS was designated to determine whether or not the name "Naval Postgraduate School" had an adverse effect on prospective students. This original question was expanded in order to do a general study of the factors influencing prospective NPS students during their decision processes.

The sample used for the Sharrock's survey was a population of 1,947 officers selected by the 1973 Navy postgraduate selection board as primary or alternate candidates for postgraduate education in technically related fields. A total of 1,242 questionnaires were returned to the NPS student research group. As the results and analyses of this survey are voluminous, only the highlights of the findings from the survey will be presented in this paper.

1. The survey showed that the NPS is viewed as enjoying high prestige, at least in Navy circles.
2. The number of officers indicating that they would accept orders to NPS far exceeds the established quotas.
3. The typical officer in the sample had very little information about the curricula at NPS.
4. The benefits of a Masters degree need to be emphasized in terms of personal advancement (fulfillment of personal aspirations) as well as in terms of career benefit.

5. The curriculum an officer is selected for should also coincide with his curriculum desires.
6. When asked what factors would be considered when deciding whether or not to accept orders to the NPS, the predominant response was that it depended upon the curriculum being offered to them.
7. When asked what advanced degree curriculum they would choose, the predominant response was management.
8. Gaining a subspecialty (P-code) from having a Masters degree was viewed favorably by the preponderance of the respondents, as was qualification for jobs open only to technically P-coded officers.
9. The lack of operational fitness reports in one's career file for the period of instruction made attending PG school seem less attractive for about 30% of the respondents, but many respondents said either this factor would have no effect or they didn't have enough information.
10. Incurring additional obligated service as a result PG school less attractive for about 40% of the respondents.
11. The factor receiving the most responses as having a negative influence on attending PG school was the possibility of failure to meet the academic requirements in the technical area and its impact, both personal and professional.
12. About 9% of the respondents volunteered concern about needing a refresher period before entering a Masters degree curriculum, and about two-thirds of this 9% seemed unaware of the availability of such a program at the NPS.

A survey of all on-board U. S. NPS students was conducted in July of 1972 by four NPS students (J. Hester, P. Robinson, J. Glutting, and

and W. Hill) and responses were received from 700 of the target population. When asked to rank order possible reasons describing why they had desired to attend NPS, the following ordering was the most typical one for students in the graduate curricula.

1. To improve my professional capability and performance.
2. To improve my promotional opportunity among my peers.
3. To improve my opportunity for a post service career.
4. As the most constructive way (personally and professionally) to spend a non-operational tour.

The responses from students in the undergraduate curricula were similar to those from the graduate students with the important exception that the reason, "To improve my promotional opportunity among my peers." was in first place.

In the data from both the graduate students and the undergraduates, the reason, "for personal academic achievement," appeared about equally often in the different rank order positions. Apparently, then, this reason is of paramount importance for about as many students for whom it is unimportant or of moderate importance.

Two other items from this survey are of particular relevance to this paper. First, when asked whether or not they would have picked NPS or another operational tour, if they had been given the option, the majority (about 72%) of the respondents indicated they would have selected coming the NPS. Second, when asked if in their future career pattern they desired to serve in assignments in which they could directly apply their advanced education, about 65% of the students indicated they so desired, while about 17% of the students indicated they did not so desire. However, when asked if they thought they would be able to apply their advanced education in subsequent tours, 54% agreed, 19% chose a "neutral",

or "don't know" response, and 27% disagreed. These last responses no doubt combine the students' beliefs about the relevancy of their course work and their doubts concerning what their future assignments would in fact be.

A third survey that is worthy of note was conducted by a NPS student (M. Boroumand, from Iran) in November 1970. Nine hundred twenty-eight U.S. students (of 1,762) responded to this survey. Five of the items used in the survey are relevant to the purposes of this paper and the responses to these questions are presented in Table SVII.

Table XVII

1970 Survey of U.S. NPS Students*

Item	Response	
	Disagree	Agree
1. You usually have enough time to spend with your family (assuming you are married and your family is here).	53%	47%
2. A graduate degree would help you after military retirement in obtaining a good civilian job.	6%	94%
3. To have a graduate degree would increase your prestige as a military officer.	17%	83%
4. Your future promotion is dependent on getting an advanced degree.	39%	61%

*Boroumand apparently eliminated people who had responded "undecided" before calculating these figures.

Items two and three in Table XVII each have response distributions indicating that, of those students who had an opinion on the item's content, most students agreed with them. The responses to item four indicate that, of the students having an opinion, 61% believed that their future

promotions were dependent on their getting an advanced degree. This percentage is one that would be interesting to track over a period of years, as it reflects, in part, the popularity of the belief that graduate education is a necessary, but not sufficient, "ticket punch" for promotion to a higher rank.

Perhaps the implications of the data from the three surveys reviewed above are obvious to the reader, but there is one other that should be put forth here in any case, as it is worth special note. In studying the responses to the many questions in Sharrock's and Hester's et al surveys, it seemed remarkable how few people claimed either "no opinion" or "insufficient information to respond" when answering the items. One can argue with the respondents' views, but unless other data are available, one should probably proceed on the belief that the respondents' views are influencing the decisions they are making. What are the sources of the beliefs of Navy officers that have been tapped by these surveys? Unfortunately, the answer to that question is not available, but some reasonable speculations about the sources of officers' opinions and beliefs can be easily made.

It is suggested that detailers, senior officers, peer groups, "folk wisdom," and, occasionally, personal experiences are the sources for these beliefs that officers carry about in their heads. The verisimilitude of data from all such sources seems open to question. It is suggested that Navy policymakers take care to establish what outcomes should be expected to follow after education (or no education) and then examine the data from surveys such as have been reported here to see if the Navy has to attempt to change some beliefs through words and via overt policy-directed actions.

After all, if the education of Naval officers is important to the welfare and performance of the Navy, the Navy (and its Postgraduate School) then have the responsibility of developing a personnel and educational system that motivates enough officers to get an education because they feel that the outcomes that will probably follow from such a choice are higher than those they would probably attain from other choices.

The next section of this paper will be concerned with the relationship between education and two other important personnel considerations: officer job performance, and the retention of qualified officers.

Officer Education and Its Relationships to Officer Performance and Retention

This section will begin by examining data on the promotion of graduate-educated Naval officers and will then turn to an examination of some retention and performance studies that have been conducted concerning Naval officers.

Table XVII displays data on the promotion of P-coded Navy officers.

Table XVIII

In-Zone Promotion Percentage*

URL P-Code Compared to Overall URL

	FY72		FY71	
	URL P-Code	Overall URL	URL P-Code	Overall URL
CAPT	68%	50%	71%	52%
CDR	78%	58%	79%	66%
LCDR	90%	74%	90%	70%

*Zone selectees divided by total in zone.

Note: The official promotion rate is 60% for captain, 75% for commander and 85% for lieutenant commander (except in FY72 where lieutenant commander was increased to 90%). These percentages are based on total number of selectees (above and below zone) divided by number of officers in the zone and, therefore, are not statistically valid. There are officers in the numerator not included in the universe of the denominator. Source: PH.D. dissertation by R. W. Hunter, Developing the New Decision-Makers: A Qualitative Analysis of the Navy Subspecialty System, American Univ., April 1973.

The data in Table XVIII indicate that the Navy should be generally pleased with the results of graduate education--at least the results as assessed by promotion decisions. The data in this table hardly reflect the results of a carefully designed experiment, however, so the results must be considered with some caution. If, for instance, officers sent to graduate school are selected based, in part, upon their prior performances as officers, then one would expect promotion statistics to have the trend shown in Table XVIII. Parenthetically, it should be noted that the hypothesis that attending graduate school hurt these officers, when it came to promotions, cannot be disproven with the data presented in Table XVIII.

Although Table XVIII contains data showing an institutionally important product, promotion, which is apparently related to graduate education, it is useful for the purposes of this paper to take a step backward and review some research on the career and job outcomes related to officer job performance and officer retention. The role of graduate education apropos these career and job outcomes will then be discussed.

A study of NROTC (regular) officers who graduated and were commissioned in the years 1951 through 1961 and were still on active duty in the Navy in the fall of 1964 is the first to be reviewed. Of the population of about 2,480 officers in this set, a random sample of 644 was selected. The obligated service time was not completed for a number of these officers. This sample therefore included both career and non-career officers.

All of the officers in the sample were asked to consider a list of career outcomes and judge their importance to them and how likely they

felt the outcome would be obtainable for them in the Navy. Table XIX contains the highlights of the results of this study.

Table XIX

Junior Officers' Beliefs about the Importance and Obtainability of Career Outcomes in the Navy

Four Most Important Career Outcomes	Five Most Likely Obtainable Career Outcomes
1. Interesting Work	1. Steady Employment
2. Feelings of Accomplishment	2. Serve Country
3. Satisfactory Home Life	3. Travel
4. Full Use of Ability	4. Early Retirement
	5. Steady Advancement
Six Least Important Career Outcomes	**Eight Least Obtainable Career Outcomes**
1. Steady Employment	1. Full Use of Abilities
2. Travel	2. High Quality of Subordinates
3. Social Prestige	3. Success Through Ability Alone
4. Active Social Life	4. Opportunity to do Work my Way
5. Have a Definite Work Schedule	5. Good Pay
6. Early Retirement	6. Work Under Consistent and Intelligent Personnel Policies
	7. Satisfactory Home Life
	8. Have a Definite Work Schedule

(Source: W. Githens, "The Values of Junior Officers Part I: Importance, Obtainability and Comparability of Various Career Values," U. S. Naval Personnel Research Activity, San Diego, 1966.)

Using the same terminology as was used in discussing the career outcomes desired by college students in an earlier part of this paper, Table XIX shows that, with the exception of "Satisfactory Home Life", the career outcomes considered most important by these officers involve

factors that are intrinsic to work itself. In contrast, the career outcomes considered least important by these officers deal with extrinsic factors found in the context of their work. It is of somewhat more than trivial importance that this study revealed that the rank order correlation between the importance and obtainability of these career outcomes was -.11.

If officers justifiably view education as instrumental for obtaining the important career outcomes listed in Table XIX, education will be a choice made by more officers and, probably, more officers will be retained in the Navy. Educational institutions themselves would play a secondary role in the construction of such a system, as the key component would be the placement of officers in jobs providing what each officer considers interesting work, a sense of accomplishment, and a full use of one's abilities. The attainment of a "satisfactory home life" seemingly depends primarily upon Navy sea-shore assignment policies. This factor is a variable that might help to make the schooling experience per se seem valuable to an officer, however.

The second set of data to be reviewed come from Navy-wide personnel surveys conducted in 1970 and 1971. A total of 20,000 officers and 25,000 enlisted men participated in these surveys. (Sources: Report numbers AD-737254 and AD-738441.) Some of the key findings from these surveys, and which are appropriate to this paper, will be presented.

Approximately seven in ten officers who did not plan to make the Navy their career in 1971 said that they could be persuaded to do so by instituting appropriate incentives. In 1970, eight out of ten of such officers could have been so influenced. The officers cited three personnel administration policy changes that would increase the attractiveness of a Navy career. These were:

1. Better information on which to base choice on the Officer Duty Preference Card, with more regard given to choices of billets and duty stations.
2. Increased recognition of outstanding performance.
3. Clearly defined career progression patterns. (Although 50 per cent of the respondents had discussed career plans with their detailers, the majority of them had not been satisfied with the career planning guidance that they had received.)

These survey results once again bring up the by-now-familiar themes of concern over job assignments, use of abilities, and success through use of abilities.

The final study to be reviewed here utilized data from three past BUPERS-sponsored personnel surveys. (Source: Lockman, et al, Motivational Factors in Accession and Retention Behavior, Center for Naval Analyses, Institute of Naval Studies, Arlington, Virginia, 1972.) This study found that in predicting reenlistment intents and decisions, the predictors were almost exclusively associated with the context of Navy life. Hence, the factors related to retention were variables extrinsic to work itself. In contrast, job performance was predicted by variables associated with the content of the individual's jobs. These content, or intrinsic, factors were those associated with the work and job itself and with recognition for achievement, feelings of achievement, and advancement. To summarize the present paper, the authors of the CNA study may be quoted: "This implies that improving the economic, social, and physical aspects of Navy life is the key to controlling reenlistment, whereas utilizing men's trained skills on meaningful jobs and commensurately recognizing their achievement is the key to enhancing performance."

Appendix E

AIR FORCE INSTITUTE OF TECHNOLOGY

As the only other U. S. military activity specifically engaged in conducting full-time, fully funded graduate education programs for active duty military officers and accredited to award graduate level degrees, the operations of the Air Force Institute of Technology (AFIT) should be of interest in the consideration of the role of the Naval Postgraduate School (NPS). In addition to the obvious similarity in the basic roles of the two institutions, there are other procedures, limitations, and problems common to both. Further, differences between the basic concepts and activities of AFIT versus NPS may serve to point to feasible alternative actions; procedures at AFIT may be worthy of adoption by NPS, and vice versa.

History

Before 1919 Army aviation officers were educated in aeronautical engineering at the Massachusetts Institute of Technology. In 1919 the War Department approved the establishment of the Air School of Engineering within the Engineering Division at McCook Field, Dayton, Ohio. In 1920 the school was redesignated the Air Service Engineering School.

When Congress authorized the creation of the Air Corps in 1926, the school was renamed the Air Corps Engineering School. The one year course and general curriculum were retained. However, in addition to its original mission of providing technical education for senior officers holding command positions, the school was given the responsibility of preparing younger officers to fill positions in research and design within the Air Corps.

The school was suspended during most of World War II. In April 1944 it was reopened to conduct accelerated three to six month courses to satisfy emergency requirements. After the war, and after study of Air Force requirements for professional and technical education by two committees (one military, and one comprised of civilian scientists and educators), the Army Air Force Institute of Technology was opened in September 1946 under the Air Material Command. It was composed of two colleges: Engineering and Maintenance, and Logistics and Procurement. The two colleges were later redesignated the College of Engineering Sciences, and the College of Industrial Administration; they were combined into the Resident College in December 1951.

When the Air Force became a separate service in 1947, the Institute was renamed. In November 1948, responsibility for the Civilian Institutions Programs, under which Air Force personnel are enrolled in civilian institutions and at selected industrial organizations, was transferred to AFIT.

The Civil Engineering School was established as the Air Installations Engineering Special Staff Officers Course in 1947 to train officers for installations engineering duties at air base, major command, and headquarters levels. The present Civil Engineering School includes both a resident program and a comprehensive nonresident study course.

In April 1950, command jurisdiction of AFIT was transferred from the Air Materiel Command to the Air University, Maxwell AFB, Alabama, but the Institute remained at Wright-Patterson AFB.

With the Ohio State University providing the bulk of the professional and academic resources, a logistics education program was established at AFIT in October, 1955. The School of Logistics became a permanent part of the AFIT organizational structure in 1958; in 1963 the name was changed to the School of Systems and Logistics.

Public Law 733 of the 83rd Congress provided that, under regulations prescribed by the Secretary of the Air Force, the Commander, Air University could confer academic degrees upon persons who met the requirements established by the Resident College. The granting of degrees was contingent upon accreditation of AFIT by a nationally recognized association or authority. The undergraduate aeronautical and electrical engineering curricula were accredited by the Engineers' Council for Professional Development in late 1955; the American Association of Collegiate Schools of Business provided the necessary accreditation for the award of graduate degrees in business administration in 1958. Accreditation of AFIT as a masters' degree-level institution, based on the programs offered by the School of Engineering, was granted by the North Central Association of Colleges and Secondary Schools in April, 1960. The accreditation was extended to include the School of Systems and Logistics in March, 1963.

Thus, the historical development of AFIT has been similar to that of NPS in many respects: the genesis in small technical training courses serving very specific requirements; the gradual evolution into longer, more

formal programs of instruction; the wartime interruptions; the detailed post-World War II studies of officer educational requirements; and the ultimate Congressional degree granting authority and accreditation of formal educational programs by professional and academic agencies. These developments have taken place within roughly the same time frame as at NPS, or a few years later. The organizational location of AFIT within the Air University (tying it, albeit indirectly, to the War Colleges and other Air Force professional schools) and the far greater use of civilian institutions for advanced education of officers are major differences between AFIT and NPS. There are other organizational differences.

Organization

AFIT is a major component of the Air University (AU). As the "Air Force's center for professional military education," AU also includes the Air War College, Air Command and Staff College, Squadron Officer School, the Air Force ROTC, USAF Chaplain School, Extension Course Institute, and the Academic Instructor and Allied Officer School. The Headquarters, AU and most of the component activities are located at Maxwell AFB, Alabama except for AFIT and the AFROTC Units. Interestingly, the Air Force Academy is not a component of AU, although it certainly deals with "professional military education." As a measure of the relative scope of its activities, AFIT accounted for about 36% ($66.0 million) of the total AU budget for fiscal year 1972.

The stated mission of AFIT is: "To provide education and training to meet the requirements of the Air Force in scientific, technological, managerial, medical and other areas as directed by Headquarters, United States Air Force."

A chart of the AFIT organization is shown as Figure 1. The Commandant is a Major General and the Vice Commandant a Colonel. The Director for Academic Affairs is a civilian educator, serving as Chief Educational Advisor to the Commandant and with responsibility for maintaining liaison with civilian institutions, i.e., somewhat analogous to the Academic Dean at NPS.

With the exception of the Admissions and Library Directorates, which are headed by civilians, the various staff functions are in the hands of military personnel. The academic functions are divided into four major components:

The School of Engineering is headed by a civilian Dean, with an Air Force Colonel serving as Assistant Dean. The School is organized into sevel academic departments plus the Aerospace Design Center. Of about 80 resident faculty members, slightly more than one-half are active duty military officers; the rest are civilians. All members of the faculty hold the standard academic ranks. In addition to the resident faculty, a number of personnel assigned to Air Force laboratories in the local area participate as Adjunct Professors and Lecturers; these numbered 28 in 1972. The school conducts both resident graduate degree-granting programs and continuing education programs. A chart of the organization of the School of Engineering is shown as Figure 2.

The School of Systems and Logistics conducts resident graduate, continuing education, and correspondence course programs. Its Dean is an Air Force Colonel. The faculty of the Graduate Education Division is predominantly military (24 of 28 in 1972; the four civilians are retired military officers). Fourteen other persons (again primarily military) are concerned with activities other than the resident program.

The Civil Engineering School conducts only continuing education courses for the professional development of Air Force Civil Engineers; it offers no degree-granting programs. The Director of the School is an Air Force Colonel; the resident faculty of 28 is almost entirely military. There are two academic departments: Engineering Technology and Management Applications.

The Civilian Institutions Directorate administers the educational programs which use the services of civilian educational, medical, and industrial facilities. This directorate has a staff of 14 military officers and one civilian under the Director, an Air Force Colonel.

The AFIT Advisory Committee is composed of seven regular members (all drawn from the civilian educational community) and one member of the AU Board of Visitors. The regular members serve three year terms and the

selectee from the AU Board normally serves for one year. The Committee has as its purpose the examination of the AFIT organization, management, curricula, facilities, etc., and advises the Commandant on matters of policy.

Programs

The School of Engineering is responsible for the education of officers in scientific and technical areas for which Air Force needs are deemed to exist and for which Air Force facilities are available and considered to be appropriate. The officer students are enrolled in baccalaureate, masters, and doctoral programs which vary in length from 15 to 24 months. A cooperative program with the Air Force Systems Command (AFSC) laboratories at Wright-Patterson Air Force Base allows about one-half of these resident graduate students to spend one or two quarters (or longer) in full time research at the laboratories. Current curricula include Aerospace Engineering, Aerospace-Mechanical Engineering, Electrical Engineering (with up to four options), Astronautics, Engineering Physics, Nuclear Engineering, Systems Engineering, Systems Management, and Systems Analysis. Up to ten courses per year are presented jointly by AFIT and AFSC as part of the "Continuing Education Program for Scientists and Engineers."

The School of Systems and Logistics conducts a basic 12 month Graduate Logistics Management Course leading to the M.S. degree. In addition, as many as 33 short courses of from one to seven weeks duration are conducted annually as part of the School's continuing education program.

The Civil Engineering School continuing education courses are open to both officers and officer-grade civilians at the middle and top management levels. The fifteen courses are of varying duration.

The Civilian Institutions Directorate administers programs conducted in about 100 civilian colleges and universities, some 165 institutions (mostly hospitals), and about 40 aerospace related industrial activities. The regular degree programs encompass academic degrees from the baccalaureate through the doctorate. Approximately 55 percent of the officer students are enrolled in engineering, science, and mathematics studies. A second major area which has grown in recent years is business administration and management. There are also a number of special programs, among them the Airman Education and Commissioning Program, Medical Education Programs, Minuteman Education, and others.

Administrative Procedures

The Admissions Directorate provides publicity for AFIT's degree programs, evaluates the academic qualifications of applicants, provides guidance and counseling, participates in the selection of enrollees and, in general, provides the usual registrar and admissions services for the resident programs.

The Selection Process. Selection for AFIT programs (either residential or at civilian institutions) may be initiated in three ways: (1) an individual officer may apply directly to AFIT Admissions for a letter of eligibility, which is later endorsed to the USAF Selection Board; (2) his records may be screened by computer under the central selection procedure - if the individual meets all of the screening criteria his name will go forward to the selection Board; or (3) as a variation of the central selection procedure, a "PCS available" screening is conducted for all officers about 12 months prior to their tentative change of station. For the service initiated screening processes, a transcript repository is maintained at AFIT along with associated computerized data base located at the AU at Maxwell AFB. These files contain complete records of nearly 95% of the officers of the Air Force - over 100,000 officers.

The annual formal Selection Board is conducted jointly by AFIT and Headquarters, USAF; the AFIT Commandant serves as President of the Board. Selections are normally completed about ten months prior to commencement of the programs.

Once an officer is selected for advanced education, the Selection Board and AFIT Admissions Directorate determines whether he will attend a resident course or be sent to a civilian institution. By and large, this is governed by the program for which an officer is selected and his school availability date.

Officers selected are notified by individual letter and given three options: to accept the program offered, to accept one of two optional programs, or to decline advanced education. The individual letters include information as the potential value of advanced education.

Evaluation. Normal scholastic grading procedures are in effect for academic work at AFIT. Evaluation of professional performance is made by

means of a 'Training Report' - an abbreviated form of efficiency report used in generally the same form by both the Air Force and the Army for officers assigned to duty under instruction. A copy of the report form is attached.

Subsequent Assignments. In almost all cases, an officer completing his advanced education is reassigned in the Air Force Specialty Code which he carried while in school, and he carries this as a "Directed Duty Assignment" for at least the initial tour after the completion of his educational program. It should be noted that all of the regular students are programmed into advanced education to meet educational needs of the Air Force as determined by the Headquarters, USAF Educational Requirements Board. Thus, initial utilization of the educationally derived expertise poses no problem.

Statistical Information

As of academic year 1972, 17,027 students had been enrolled in all of the types of educational programs conducted by AFIT. Resident students in that year numbered 6,155; the resident faculty numbered 192.

The numbers of officers and civilians who completed studies, by program, during academic year 1972 were as follows:

Degree Programs

School of Engineering	216
School of Systems & Logistics	131
*Civilian Institutions	3,005

Continuing Education Programs

School of Systems & Logistics	4,951
Civil Engineering School	1,518
Civilian Institutions	1,708

*Includes Airman Education (equivalent to Navy NESEP)

Thus it will be noted that 3,352 individuals were awarded degrees, while 8,177 completed non-degree continuing education programs of varying lengths.

The total number of degrees awarded by AFIT, by field and degree level, is shown in Table 1. This does not include degrees attained under the Civilian Institutions Programs.

Table 1

Degrees awarded by Air Force Institute of Technology as of AcYear 1972

Degree Field	Level			
	BS	MS	MBA	PhD
Aeronautical Engineering	168	244		
Electrical Engineering	352	709		
Nuclear Engineering		241		
Ordnance Engineering		23		
Industrical Administration			94	
Applied Comptrollership			69	
Engineering Administration			87	
Engineering Management			27	
Astronautics		231		
Aerospace Engineering	83	514		31
Reliability Engineering		107		
Logistics Management		819		
Materials Engineering		23		
Systems Management		179		
Space Facilities		66		
Space Physics/Engr Physics		162		
Systems Analysis		69		
Retrocative degrees-School of Business			106	
TOTALS	603	3,387	383	31

Summary

There are many similarities between the Air Force Institute of Technology and the Naval Postgraduate School; they share a certain uniqueness among U. S. military educational institutions. However, the differences are perhaps more significant, in the sense of what benefits one institution may derive from the practices and experiences of the other.

In terms of the four essential elements of advanced education for military officers in a closed personnel system -- identification of needs, recruiting and selection, the educational process, and utilization -- the following differences may be significant. Determination of requirements is accomplished in basically the same manner by both the Air Force and the

Navy. In the recruiting and selection process there are major differences: the Air Force does a more thorough job of encouraging officers to enter appropriate advanced programs; in part, this is facilitated by the far greater participation of the institution (AFIT) in the process. The fact that AFIT serves as a central repository for academic records of all active duty Air Force officers allows this to be the case. The most significant models for possible change by NPS are within the educational process itself: the far greater emphasis on continuing education programs under AFIT, and the extensive use of experience tours at appropriate laboratories for the degree granting programs, are worthy of note. In the matter of utilization, the Air Force experiences fewer problems in view of the fact that primary identification codes for officers are modified in light of their educational experiences.

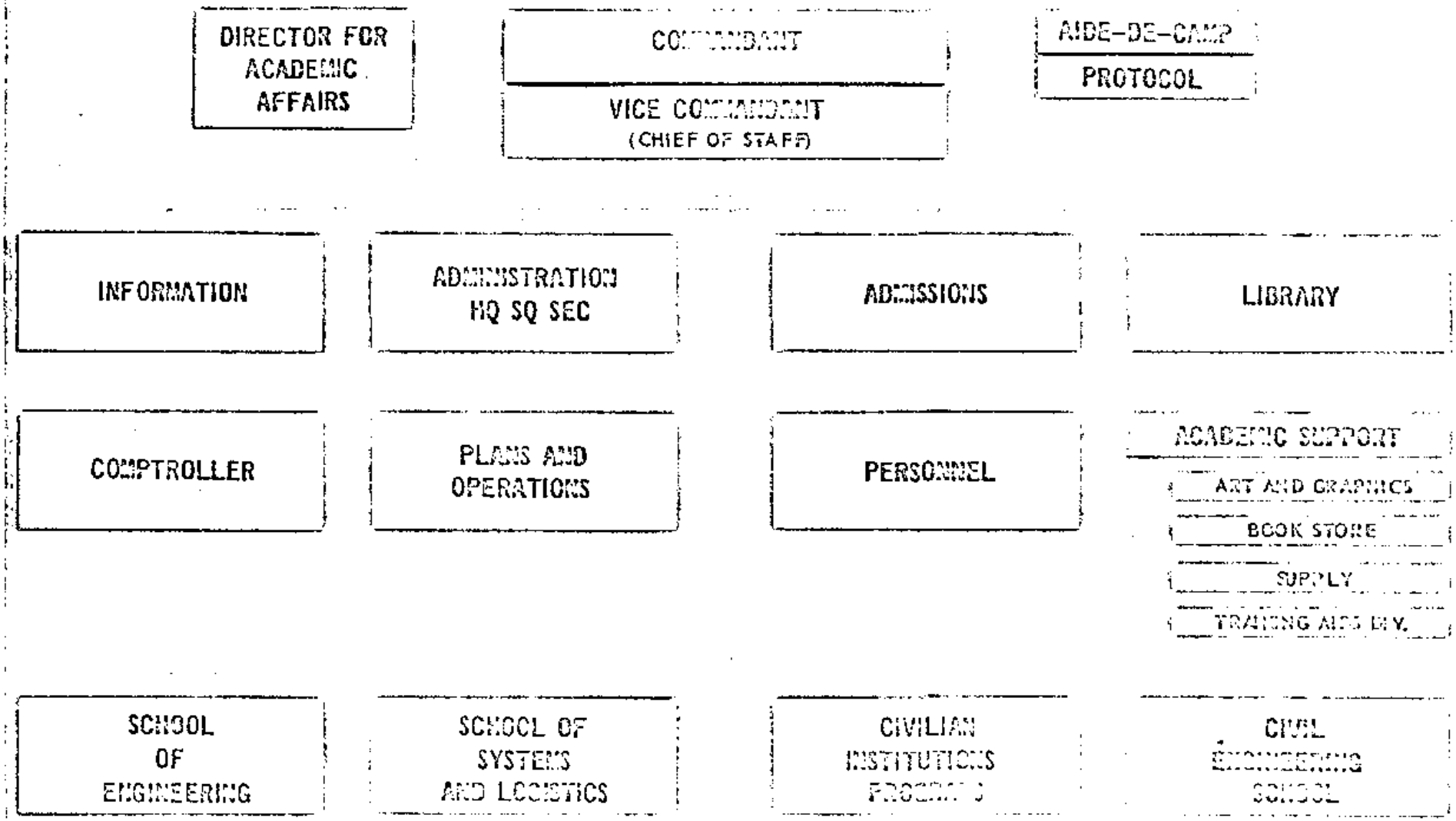

DIRECTOR FOR ACADEMIC AFFAIRS
COMMANDANT
VICE COMMANDANT (CHIEF OF STAFF)
AIDE-DE-CAMP
PROTOCOL
INFORMATION
ADMINISTRATION HQ SQ SEC
ADMISSIONS
LIBRARY
COMPTROLLER
PLANS AND OPERATIONS
PERSONNEL
ACADEMIC SUPPORT
ART AND GRAPHICS
BOOK STORE
SUPPLY
SCHOOL OF ENGINEERING
SCHOOL OF SYSTEMS AND LOGISTICS
CIVILIAN INSTITUTIONS
CIVIL ENGINEERING SCHOOL

Figure 1.

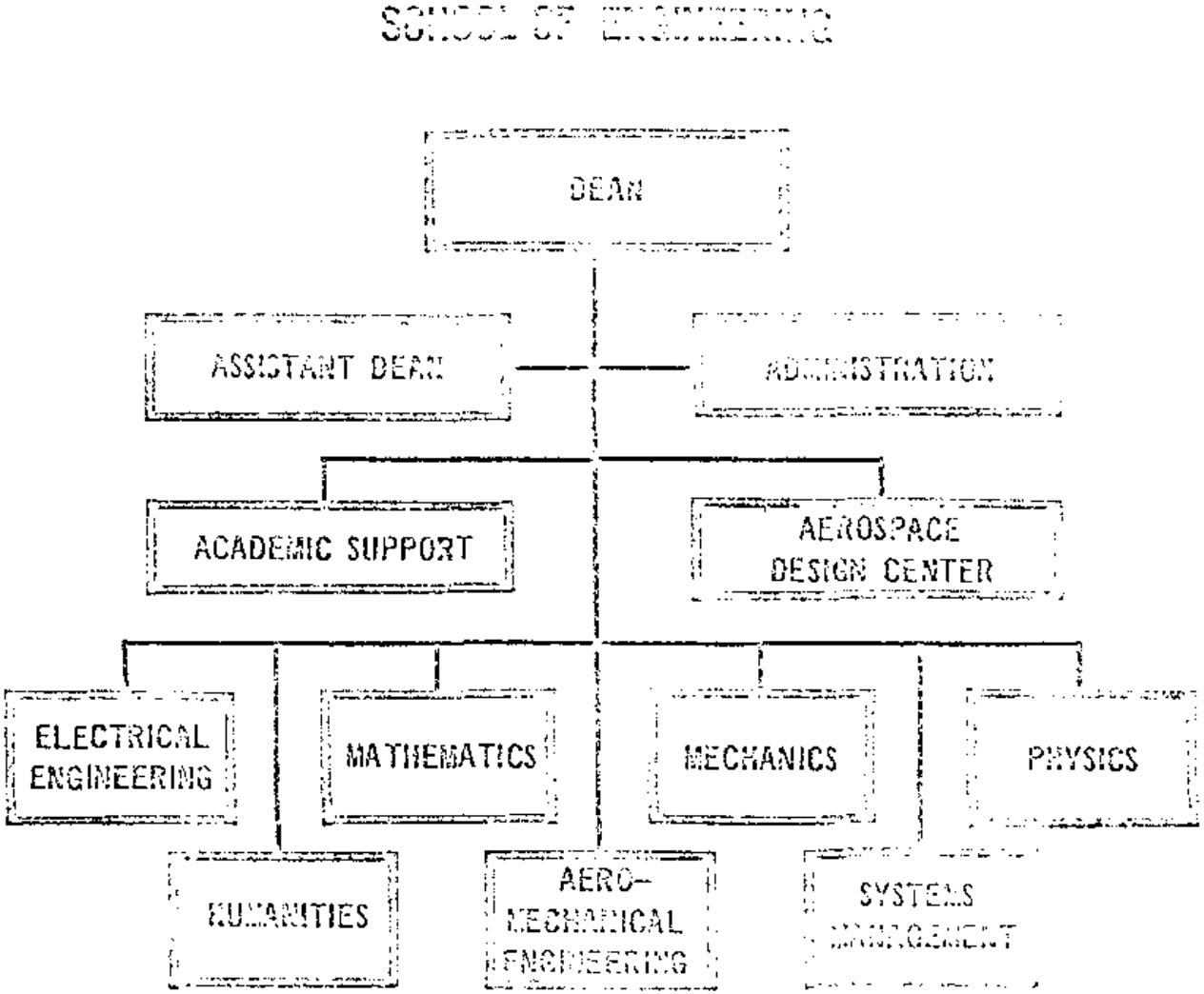

SCHOOL OF ENGINEERING
DEAN
ASSISTANT DEAN
ADMINISTRATION
ACADEMIC SUPPORT
AEROSPACE DESIGN CENTER
ELECTRICAL ENGINEERING
MATHEMATICS
MECHANICS
PHYSICS
HUMANITIES
AERO-MECHANICAL ENGINEERING
SYSTEMS MANAGEMENT

Figure 2.

I. IDENTIFICATION DATA *(Read AFM 36-10 carefully before filling out any item)*

1. LAST NAME—FIRST NAME—MIDDLE INITIAL	2. SSAN		3. ACTIVE DUTY GRADE	4. PERMANENT GRADE
5. ORGANIZATION COMMAND AND LOCATION	6. AERO RATING	CODE	8. PERIOD OF REPORT	
			FROM:	THRU:
	7. ACADEMIC PERIOD		9. REASON FOR REPORT	
			☐ FINAL ☐ ANNUAL ☐ DIRECTED	

10. NAME AND LOCATION OF SCHOOL OR INSTITUTION	
11. NAME OR TITLE OF COURSE	12. LENGTH OF COURSE

II. REPORT DATA *(Complete as applicable)*

1. COURSE HOURS COMPLETED	2. COURSE HOURS FAILED	3. AFSC AWARDED	4. AERO RATING AWARDED	5. DEGREE AWARDED

6. COURSE SUCCESSFULLY COMPLETED *(Final report only)*

☐ YES ☐ NO *(If "No," state reason)*

7. TITLE OF THESIS	8. ACADEMIC FIELD

III. COMMENTS

IV. REPORTING OFFICIAL

TYPED NAME, GRADE, SSAN AND ORGANIZATION	DUTY TITLE	SIGNATURE
		DATE

AF FORM SEP 71 475 PREVIOUS EDITION IS OBSOLETE

EDUCATION/TRAINING REPORT